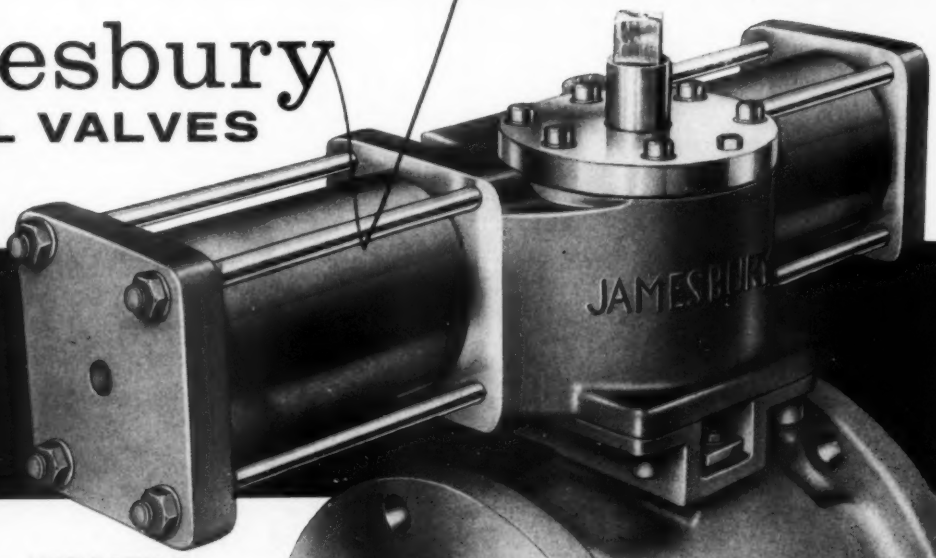
TECHNOLOGY DEPARTMENT

- Buckeye's new dissolving pulp mill
- Aldehyde-based synthetic adhesives
- Linear pulpwood programming
- Cooperative felt evaluation

The Paper Industry

Publication of PAPER AND PULP MILL CATALOGUE

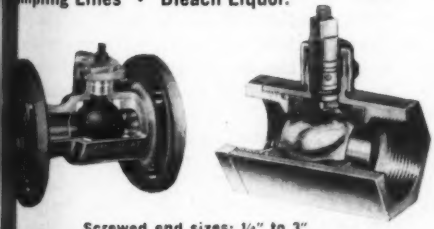
jamesbury
BALL VALVES



EPENDABLE • VERSATILE

niversally accepted Jamesbury Ball lve design now in successful oper- ion on:

gester Blow Service, White, Black and Green quor Lines • Water Lines • Gas Off Lines Lines • Instrument Lines • Acid Lines mpling Lines • Bleach Liquor.

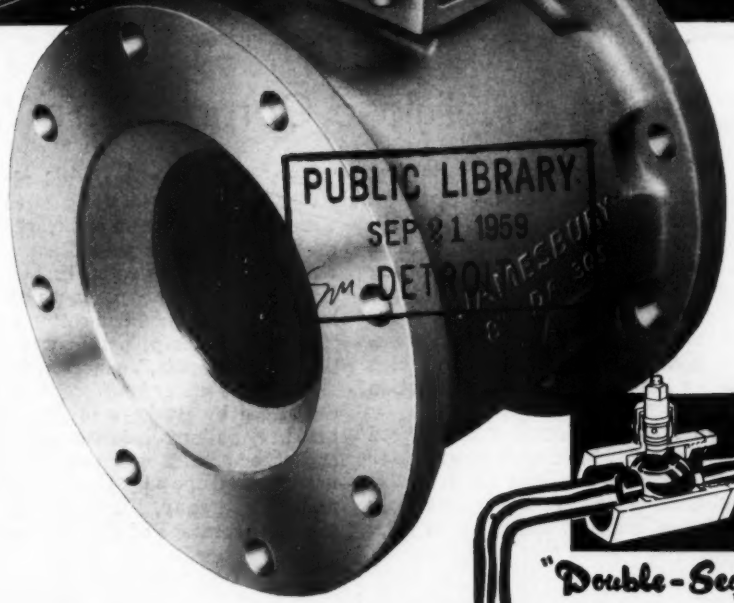


Screwed end sizes: ¼" to 3"
Flanged sizes: ½" to 10" (150# and 300# series)

MATERIALS

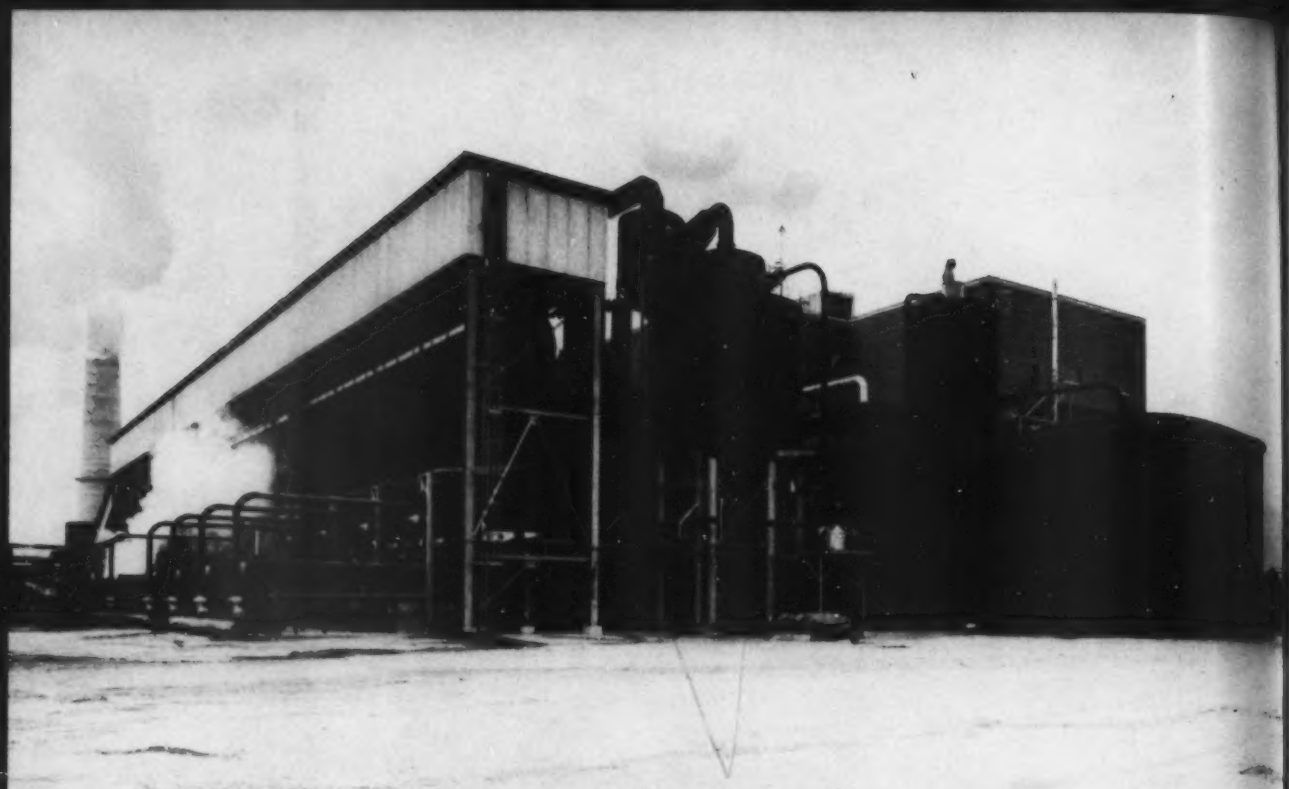
303 and 316 stainless steel
Carbon steel • Bronze • Aluminum • P.V.C.

Available on application
Alloy 20, Ductile Iron and Monel



Ask for the new brochure "The Jamesbury Ball Valve In Pulp and Paper Mills"

JAMESBURY CORP., 150 NEW STREET, WORCESTER, MASS.
Distributors in Principal Cities



LUMMUS ENGINEERS AND CONSTRUCTS

Buckeye Cellulose Corporation's Wood Pulp Expansion

NATION'S OLDEST PRODUCER OF CELLULOSE PULP DOUBLES PRODUCTION CAPACITY OF FOLEY, FLORIDA, PLANT. The Buckeye Cellulose Corporation, America's oldest yet fastest growing cellulose pulp producer, will soon put into operation a new $20,000,000 wood pulp unit at Foley, Florida, thus completing an expansion program which doubles the plant's original production capacity.

The Lummus Company engineered and constructed the process units for these expanded facilities which assure Buckeye's customers a steady supply of highest quality Southern pine pulp. This new Lummus-designed plant is still another step in the growth of a company with 37 years of experience in producing cellulose pulp. Buckeye has the world's most complete line of celluloses, being the only producer of cellulose from both wood and cotton linters. Its cotton linter pulp mill was established in Memphis, Tennessee, in 1921.

Highest standards of processing are demanded by Buckeye to provide the best in cleanliness, brightness, strength and other specific qualities desired by users of Buckeye pulp. Long a research-minded company, Buckeye spends a higher percentage of sales on research activities than any other pulp producer.

In addition to engineering and constructing the process units for the Foley expansion, Lummus hired and coordinated various subcontractors for other portions of the plant. In spite of the complexity of such a large program, Lummus met the construction schedule and the new mill is assured a smooth start-up.

The Lummus Company has designed, engineered and constructed over 800 complete plants for the process industries throughout the world in the last 50 years. Lummus world-wide experience is at your disposal.

LUMMUS

ENGINEERS AND CONSTRUCTORS FOR INDUSTRY THROUGHOUT THE WORLD

385 MADISON AVENUE, NEW YORK 17, N. Y.

HOUSTON · WASHINGTON, D. C. · MONTREAL · LONDON · PARIS · THE HAGUE · MARACAIBO

Both 180" Sandy Hill removable fourdrinier machines at Buckeye Cellulose Corporation's Foley, Florida plant operating on acetate and dissolving pulp, are custom designed units for fast and heavy duty and offer the most precise controls to regulate and maintain consistent quality standards.

Buckeye Installs A Second Sandy Hill Machine

Now in production at Buckeye Cellulose Corporation in Foley, Florida, is a second pulp forming Fourdrinier machine, sister to the one that started its profitable operation in June, '54. Both were designed and built by Sandy Hill.

There are many reasons for this repeat order. Here are a few of them:

1. The whole Fourdrinier combines structural strength and simplicity of design.

2. Multiple manifold Sandy Hill Bertrams flow control unit assures **absolute uniformity of distribution of stock on wire.**

3. Sandy Hill Selective Drive—an all mechanical drive—gives operating ease and maintenance economy while controlling draws to a fine degree.

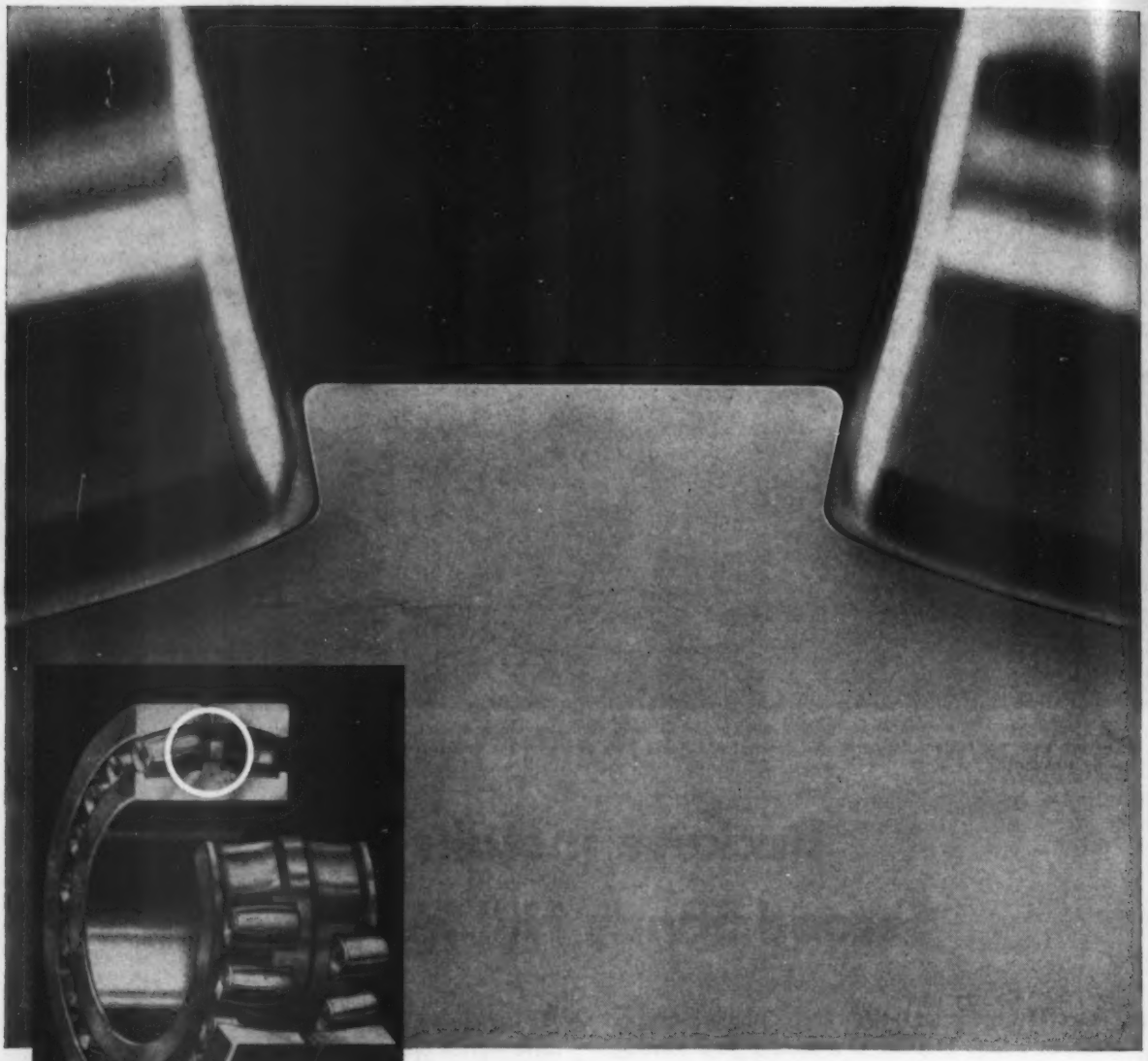
4. Special dryer section design provides **maximum convenience in working around dryer nest.**

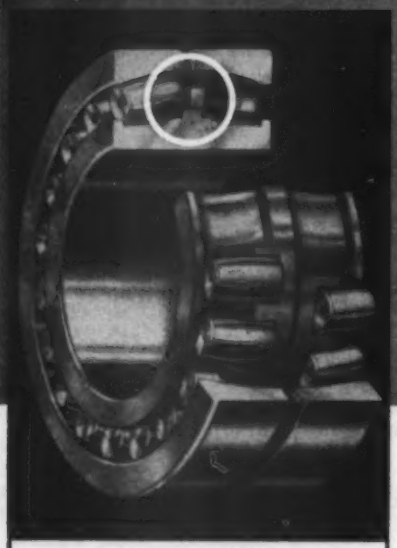
5. Constant speed Roll Master Reel winds 10-ton jumbo rolls, loading hydraulically in starting and final position, with provision for pressure adjustment.

If you are planning a new pulp or paper mill—or improvements in an existing one—consult Sandy Hill. Your company can profit by the integrity of construction and faithful consideration of detail that has characterized Sandy Hill equipment for over 100 years.

Sandy Hill congratulates Buckeye on doubling its capacity on high quality pulps.

THE
SANDY HILL
IRON AND BRASS WORKS
HUDSON FALLS, N. Y.





TORRINGTON
Spherical Roller Bearings Offer:

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life

Send for new Torrington Spherical Roller Bearing Catalog #258.

Keystone of Stability!

The integral center guide flange of the *Torrington* Spherical Roller Bearing provides *positive* roller guidance—the one best way to insure operating stability under radial and thrust loads.

Center guide flange surfaces and roller ends are ground to a common spherical radius. The asymmetrical roller seeks this flange under load, bearing lightly but constantly against it. Roller wobble and skewing are eliminated, and stress concentrations leading to early failure are avoided. Bearing operation is cooler, quieter and smoother.

The integral guide flange is adapted from the same principle used in the design of Torrington Tapered Roller Bearings. It is an engineering refinement, based on experience in all types of applications, that insures outstanding performance in your equipment. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

TORRINGTON BEARINGS

Every Basic Type of Anti-friction Bearing

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 41 **NUMBER 6** **SEPTEMBER 1959**

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

Publication Staff:

President and General Manager
A. SCOTT DOWD

Secretary
EDLA DURBON

Editorial Director
A. W. J. DYCK, Ph.D.

News Editor
BRUCE H. BRAMMER

Market Analyst
JEROME KASSIDAY

Advertising and Production Manager
CHARLES E. DOWD

Circulation Manager
JOHN H. REARDON

Assistant Circulation Manager
LEONA M. NUTTALL

Advertising Representatives:

CHICAGO 5: **Jack Henderson,** 431 South Dearborn Street, Wabash 2-3543

CLEVELAND 7: **Richard E. Cleary, Inc.,** 15515 Detroit Avenue, Lakewood 1-7125

EASTERN: **Charles G. Peck,** 299 Madison Avenue New York 17, N. Y., Murray Hill 2-2499

SOUTHEASTERN: **Fred W. Smith,** 1201 Forest View Lane — Vesthaven, Birmingham 9, Ala., Tremont 1-5762

WEST COAST: **Murray Bothwell,** 234 East Colorado St., Pasadena, Calif., Ryan 1-9155

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950 issue.

Published at 1501 Washington Road, Mendota, Illinois.

Address all correspondence to:
Fritz Publications, Inc.
431 South Dearborn Street
Chicago 5, Illinois

BPA

Member: Business Publications Audit of Circulation Inc.

Accepted as controlled circulation publication at Mendota, Ill.

Subscription rates: United States, U. S. Possessions and Canada $3.00 for one year. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

Features . . .

Editorial — Economic productivity — a tool for improving economic efficiency 359

Whither? — New equipment and woodlands mechanization save $25 per ton of newsprint — High amylose corn developed — Effect of fertilizer on tree growth to be studied in a greenhouse — A liquid dye for paper — Filming amine reduces steam line maintenance 440

Buckeyes' Foley Mill ups capacity to 200,000 tons of dissolving pulp 376

Adhesives in the paper industry: Part VI 382

Linear programming and optimal cutting policies 384
by Thomas C. Theiler

Cooperative felt evaluation programs pay off 387
by W. S. Wightman

Paper machine winder reduces finishing operation 389
by J. W. Dragonetti

Mills are adopting turbine aeration 401

Forestry notes 402

Recent expansions in the industry 402

Hardinge clears muddied waters for Provincial Paper 404

News . . .

News of the Industry 401
Names in the News 412
Necrology 436

Departments . . .

Current Comments 395
Coming Events 410
Foreign Abstracts 418
Patent Reviews 422
New Products 425
New Literature 433
Market Quotations 437
Index to Advertisers 439

The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** An index to each volume is issued annually by the publisher as a part of the April number.

© 1959 by Fritz Publications, Inc.

RAYOX®

R.T. VANDERBILT CO. N.Y.S.A. · RAYOX · AMERICAN PRODUCTS

Pure Titanium Dioxide

RUTILE AND ANATASE GRADES

For maximum
WHITENESS
BRIGHTNESS
AND OPACITY

R. T. VANDERBILT CO., INC.

230 PARK AVENUE · NEW YORK 17, N. Y.

From our point of view..

Economic productivity — a new tool for improving economic efficiency

Current steel industry wage negotiations are focusing attention on the labor problem and on a search for a working formula that would correlate earnings more directly with product values, with a view to generating non-inflationary earnings for both employees and their company.

Today's emphasis on greater productivity makes it imperative that management and labor fully appreciate the fact that there must be mutual benefits for the production efforts, and that there is no advantage in a program of exploiting each other. Rather, the thinking and efforts should be directed toward exploiting the opportunities offered by modern technology, new materials and products, new processes and methods.

To permit a better correlation of employee earnings with product output values, it becomes necessary that we have an easily understood and easily applied measure of productivity — so that its application in an industrial establishment will "stimulate employee cooperation and teamwork toward measurably higher productivity."

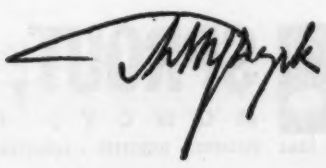
Economic productivity, as outlined in the Rucker Plan, developed by The Eddy-Rucker Nickels Co., Cambridge, Mass., is a new approach to a productivity-pay relationship that measures gains or losses in productivity in terms of output values per dollar of wages paid as against physical productivity which measures changes in productivity in terms of materials output per man hours. It is described as "an engineering application of the share of production principle applied to the individual plant or business."

A necessary prerequisite to the application of economic productivity is the establishment of a standard productivity ratio for each plant, before management can use it as a tool for achieving added economic efficiency. As an example of the comparative productivity ratios that have been set up for various industries as a whole, the following may be of interest: Chemicals — 4.433; Paper — 2.711; Lumber — 1.941.

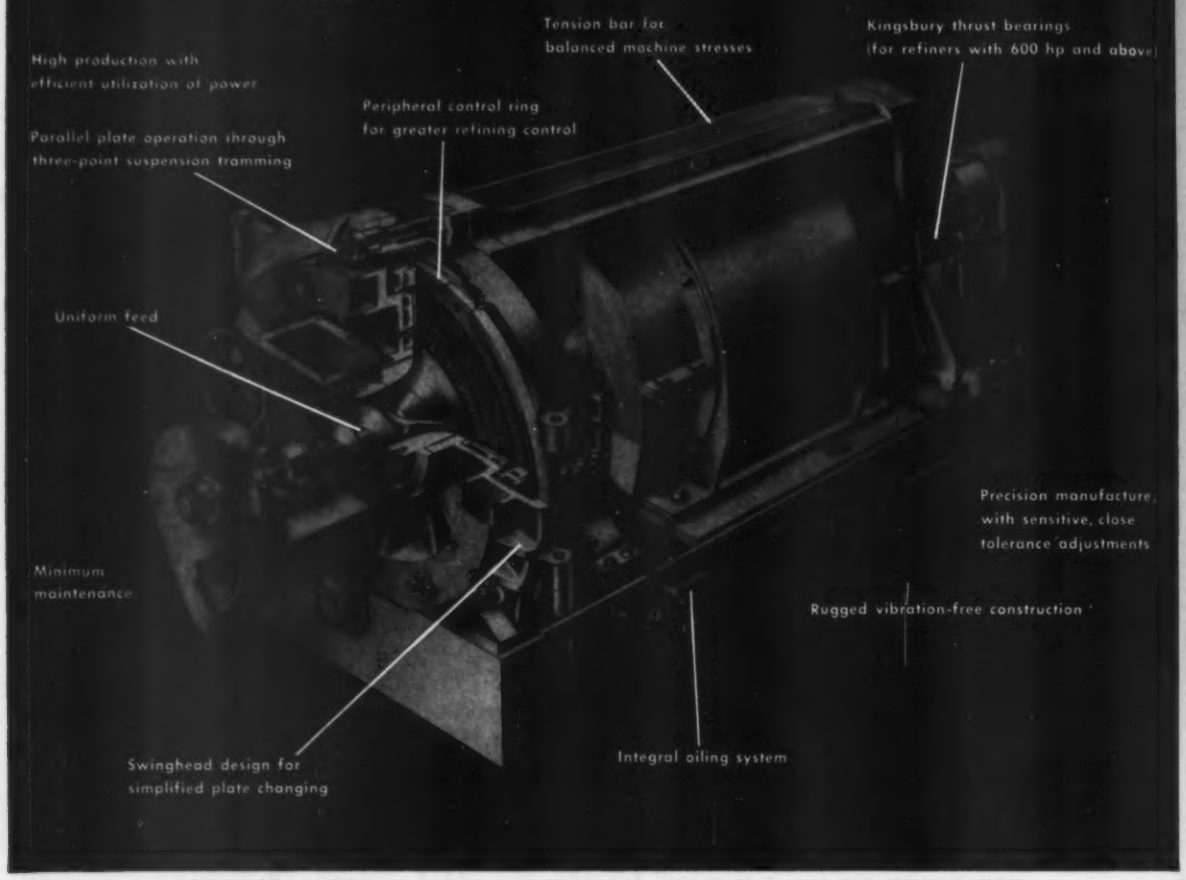
Once the productivity ratio for any single manufacturing plant has been established, management is then in position to take steps toward exceeding this ratio and utilizing any additional earnings for (1) incentive earnings paid to employees and (2) other corporate purposes.

The employee's incentive earnings are determined on a pro rata basis in accordance with his basic salary and the percentage constituting employee gains under this scheme. This gives all employees an equality of opportunity and an incentive to work toward an improvement of their own individual earnings.

While we do not profess to be an authority to recommend this plan as one that is best suited for every industrial establishment, it would seem advisable for management of every paper mill to at least familiarize itself with the provisions and operations of this plan — if for no other purpose than to compare it with and make improvements in the company's own plan.



11 POINTS OF SUPERIORITY


High production with efficient utilization of power
Parallel plate operation through three-point suspension tramming
Uniform feed
Minimum maintenance
Swinghead design for simplified plate changing
Tension bar for balanced machine stresses
Peripheral control ring for greater refining control
Integral oiling system
Kingsbury thrust bearings (for refiners with 600 hp and above)
Precision manufacture, with sensitive, close tolerance adjustments
Rugged vibration-free construction

THE WORLD-FAMOUS 36-2 "SPROUT"

single disc precision pulp refiner

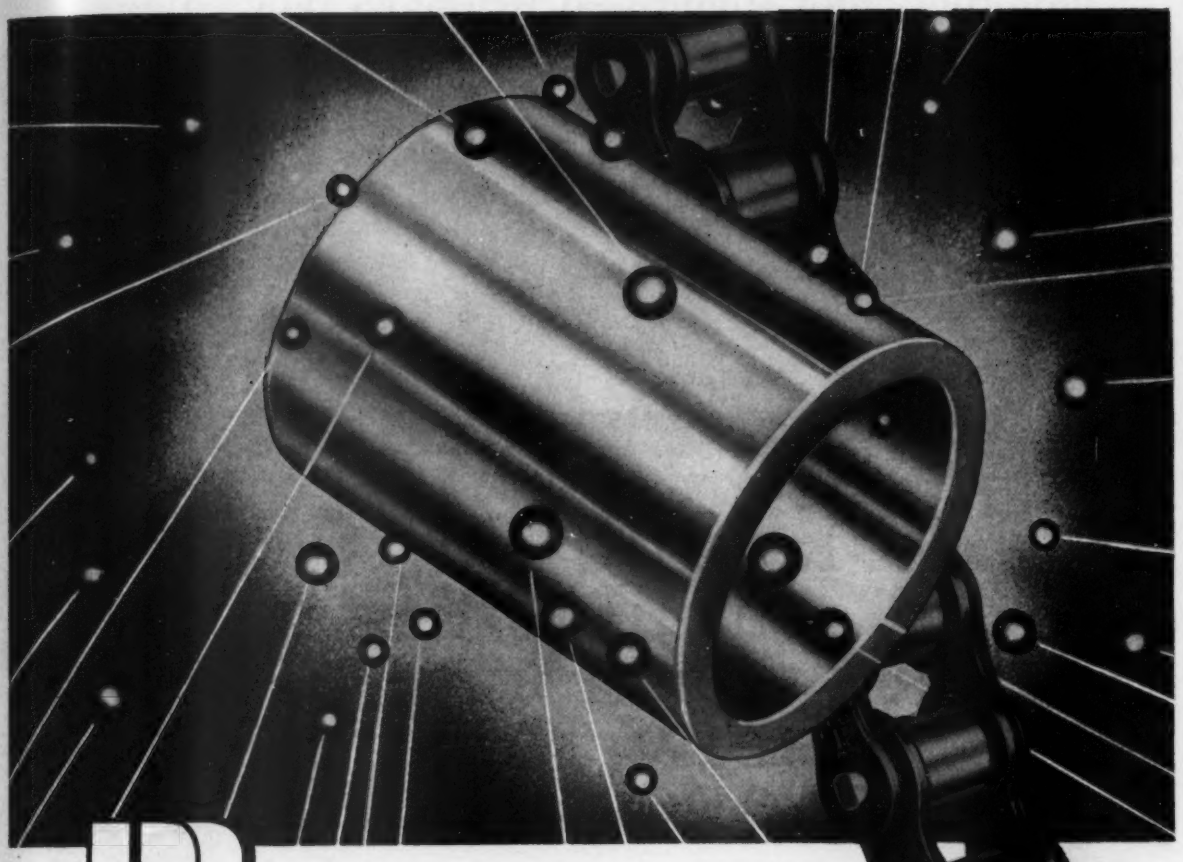
The 36-2 Sprout refiner is the most efficient disc refiner in quantity of output and in quality of refined pulp per horsepower input. It is preferred throughout the industry for every pulping application where rubbing and brushing action, without cutting, is required. Sprout-Waldron units lead the field in the refining of semichemical pulp, cold caustic pulp, screen rejects, wastepaper stock; brown stock and hot stock refining of high yield kraft pulp; refining of bagasse, flax and straw pulping; as well as preparation of insulation and hardboard fiber. For the latest details on the 36-2 Sprout, request Bulletin 96-B.

SPROUT, WALDRON & CO., INC.

MUNCY, PENNSYLVANIA, U. S. A.

SINCE 1866 REFINERS • DIGESTERS • CONVEYORS • FEEDERS • SCREENS • MIXERS • DRAINERS • FIBER PRESSES • STOCK PROPORTIONERS

E/200



Rollers
fortified against fatigue

Shot-peening "cold-works" extra fatigue life into LINK-BELT roller chain

Shot-peening gives rollers of Link-Belt precision steel roller chain exceptional strength and stamina. And after shot-peening, they are burnished rather than ground or sanded. This achieves a SILVER-BRITE finish—and more important, *retains the fatigue resistant qualities of shot-peening.*

Other long-life "extras" of Link-Belt roller chain include: close heat-treat control, lock-type bushings, pre-stressing, pitch-hole preparation. For details, see Book 2657.

LONG LIFE AHEAD! Rollers for Link-Belt precision steel roller chain tumble out of shot-peening machine after being cold-worked to withstand punishment of today's high-speeds and heavy loads.

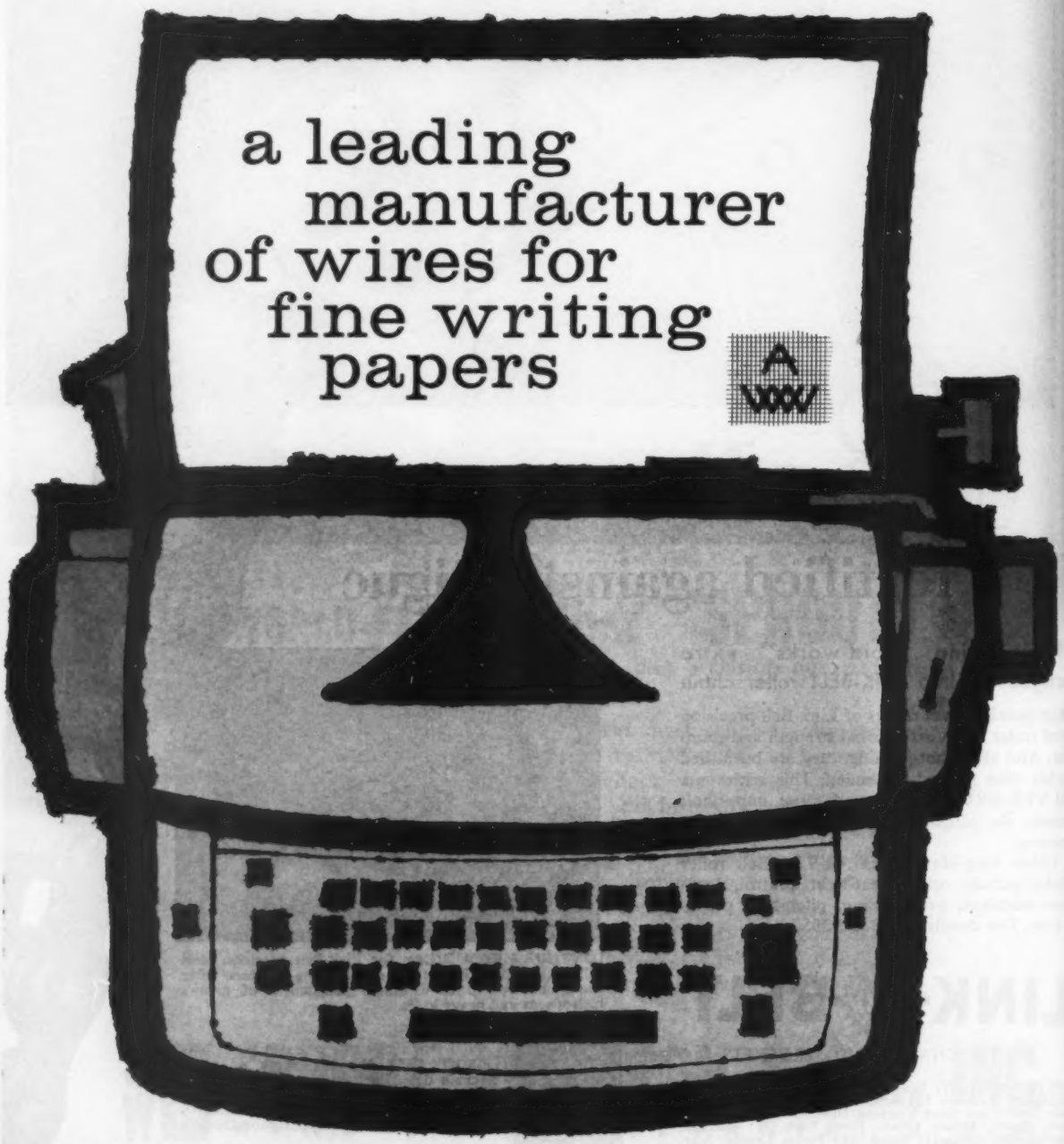
LINK-BELT

ROLLER CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,081

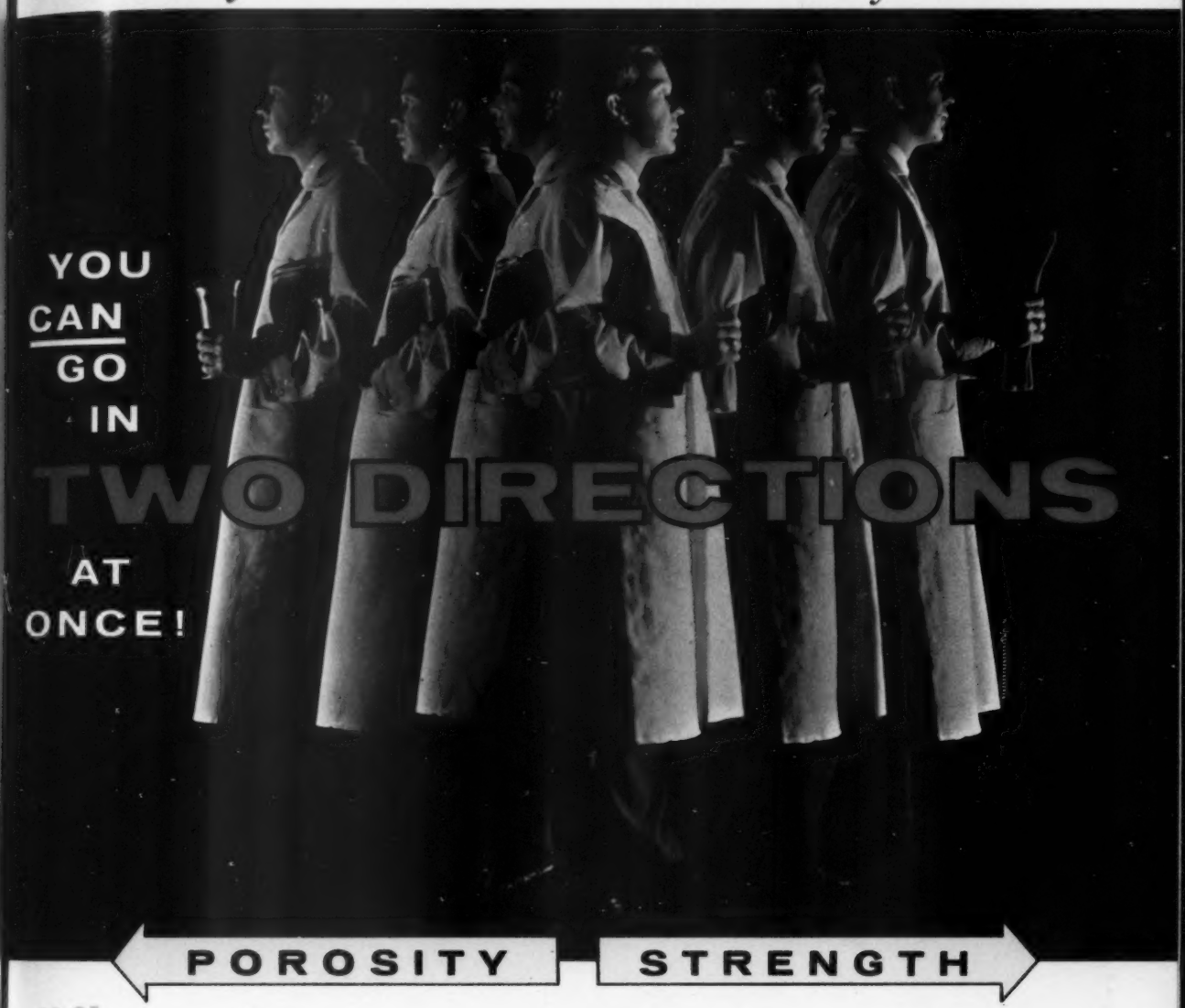
BOOK 2657 has 154 pages of roller chain data. For your copy, contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

APPLETON
WIRES
ARE
GOOD
WIRES



APPLETON WIRE WORKS CORP., PLANTS AT APPLETON, WIS. AND MONTGOMERY, ALA.: INTERNATIONAL WIRE WORKS, MENASHA, WIS. AN AFFILIATED COMPANY

with Albany Felt chemical treatments and synthetics . . .



POROSITY ← → **STRENGTH**

U-31 K-3 NYLON H-12 J-3 ORLON H-12 Z-5 DACRON W-6 U-55 H-14

At last, the ideal balance between *strength* and *drainage* in felt design can be obtained. With Albany's patented synthetic content design, greater resistance to abrasion is provided *and* Albany's special chemical treatments reduce the natural tendency of the synthetic yarns to be non-absorbent. Thus, two opposite aims can be reached simultaneously.

Most important to you, this combination of synthetics and chemical treatments can put your machine way ahead in production. Remember, Albany Felts not only last longer, they also give you *more tons per day.*

Start the wheels rolling toward maximum felt life and high daily production in *your* mill. Consult your Albany Felt Sales Engineer. Working with him is the team of experts who wrote the book — "Improved Felt Performance!"

If you have not received your copy of Albany's newest technical handbook "Improved Felt Performance" write for it today.

ALBANY FELT COMPANY

MAIN OFFICE AND PLANT, ALBANY, N. Y.

OTHER PLANTS: HOOSICK FALLS, N. Y.; N. MONMOUTH, ME.; ST. STEPHEN, S. C.; COWANSVILLE, P. Q.

NEW IDEAS FOR BETTER PAPERMAKING— FROM THE WORLD'S LARGEST MANUFACTURER OF PAPER MACHINE FELTS

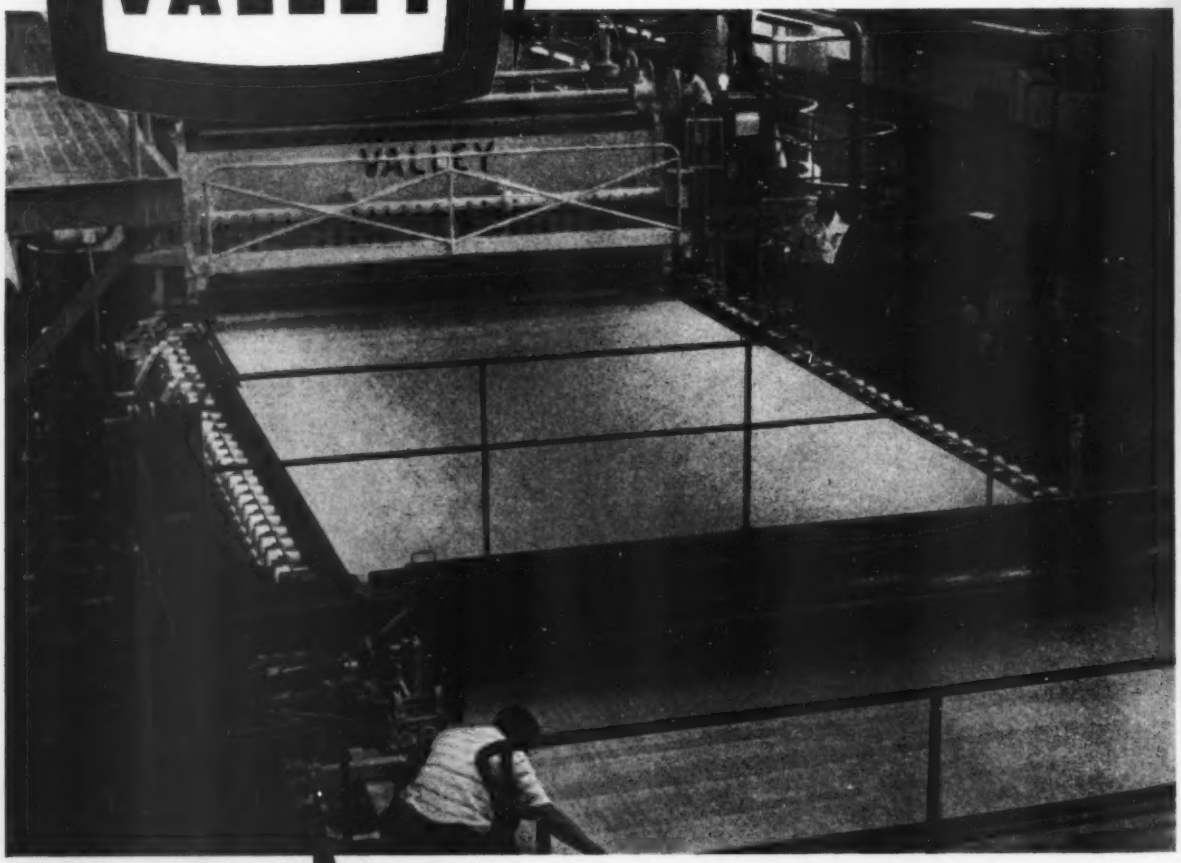
again ... it's INLET and HEADBOX by VALLEY

on NEW No. 10 Machine at ECUSTA PAPER DIVISION

OLIN MATHIESON CHEMICAL CORP.

Pisgah Forest, North Carolina

Making One-Time Carbon Bible and Lightweight Printing Papers



Consult... **VALLEY IRON WORKS COMPANY**
APPLETON, WISCONSIN

DOW | COATINGS

Paper maker tries Latex for "size"

...finds new adhesive permits higher solids content in coatings

In search of a better adhesive for their pigmented size press coatings, a nationally known manufacturer of coated and uncoated paper found the answer in low-cost Dow Latex. Here's their success story!

Modifying their original formula—an all-starch adhesive—with a percentage of Dow Latex, they were able to produce a binder with a lower viscosity. This permitted them to revise their coating formulation to allow for a higher solids content. *The results were gratifying:* heavier coatings with better coverage, better printing quality. And the presence of latex in the formula gives the coating unique advantages . . . greater flexibility . . . better water resistance . . . easier calendering . . . higher gloss.

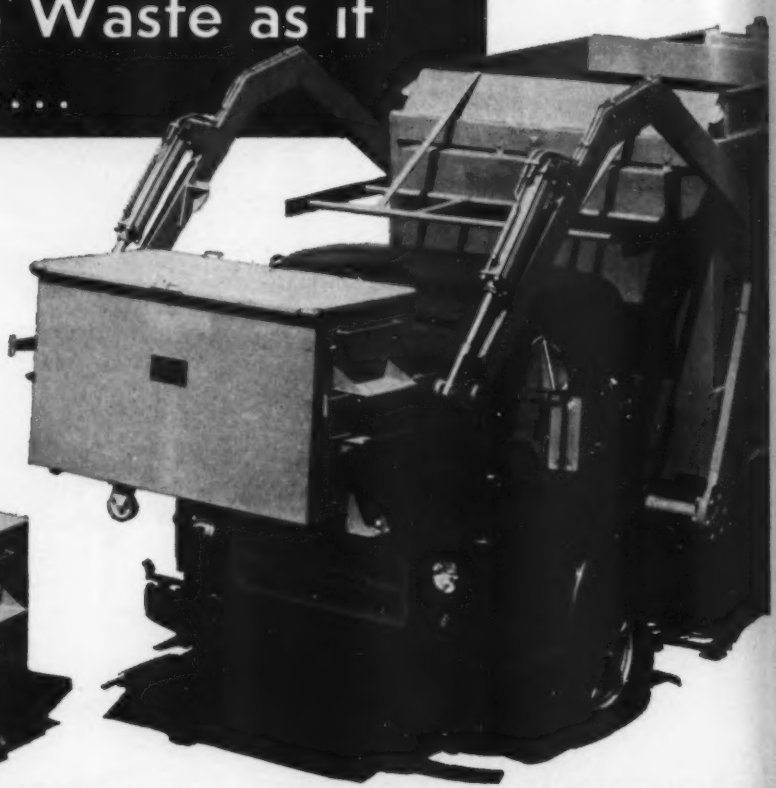
In much the same manner, Dow Latex can give your paper products a quality boost. It's certainly worth investigating . . . contact your nearest Dow Sales Office for more details. Or write THE DOW CHEMICAL COMPANY, Dept. 2322DN9, Midland, Michigan, for complete technical information.

THE DOW CHEMICAL COMPANY · MIDLAND, MICHIGAN

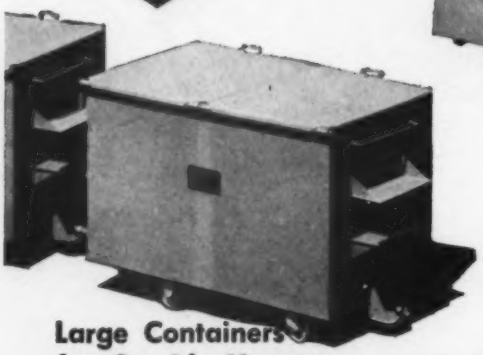
cut disposal costs by two-thirds...

Containerize Waste as it Accumulates...

Patents Pending



Small Tracking Containers for Indoor Use...



Large Containers for Outside Use...

Mfd. By DEMPSTER BROTHERS Inc.

Self-Loading DEMPSTER-DUMPMASTER Handles 6 Sizes of Containers...

If you're using boxes, bins, cans or carts to handle or store big-volume waste and refuse, you can reduce costs by more than two-thirds with the new DEMPSTER-DUMPMASTER System of waste storage and collection.

One Dumpmaster serves any number of detachable metal containers placed at waste accumulation points. Making its rounds, the Dumpmaster picks up each container, in turn, empties the contents into its packer body and compresses the material to a fraction of its former volume assuring big pay loads on every trip to the disposal area.

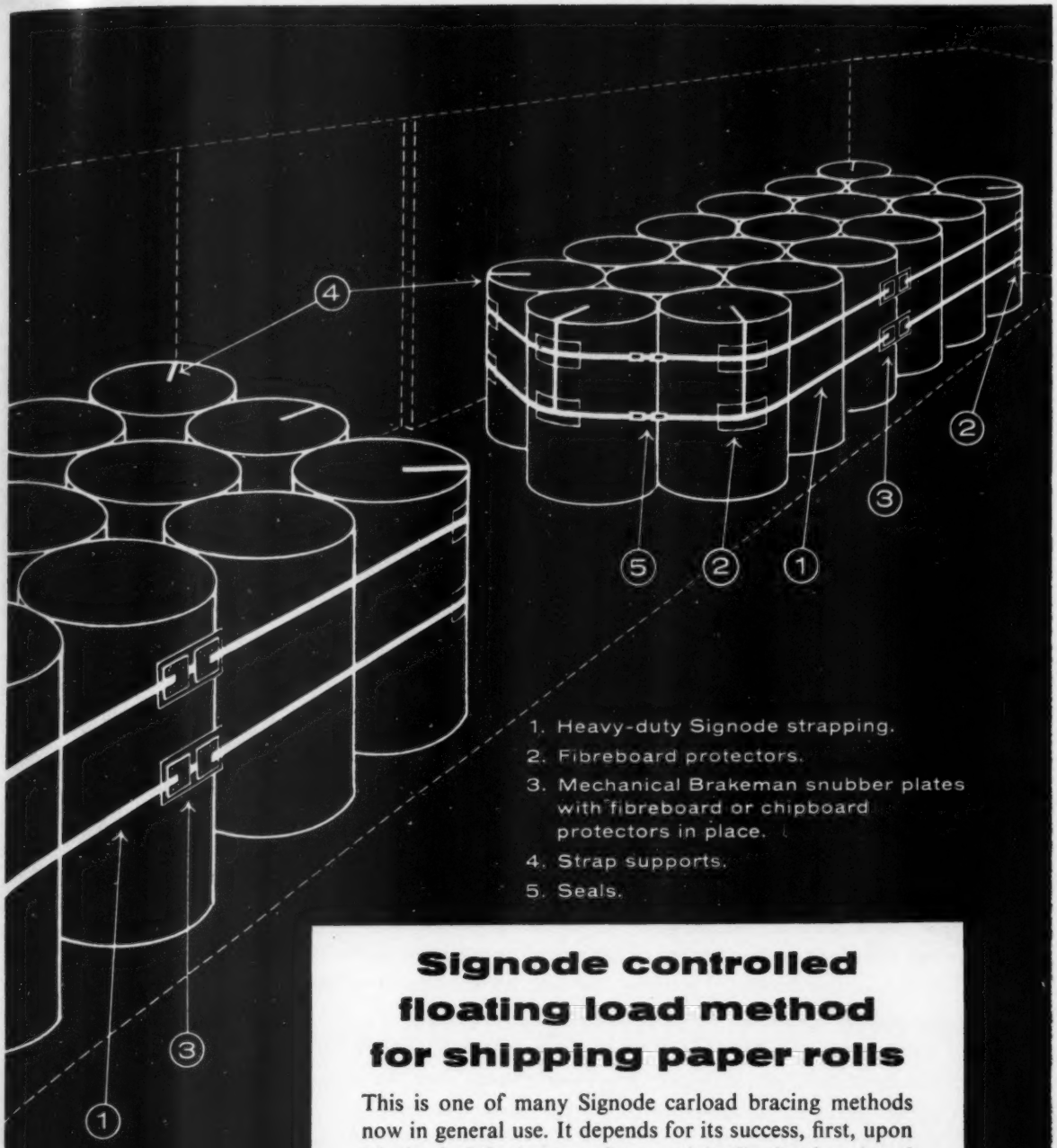
The DEMPSTER-DUMPMASTER is economical! One man operation. It's safe! Clearance lifting arms never pass the cab windows, can't injure operator. Containers can be used indoors or outdoors, on ground, below grade or on a dock.

This system is also available on a monthly fee basis through a nearby DEMPSTER-DUMPMASTER equipped private hauler, (name furnished on request).

WRITE TODAY FOR FREE BROCHURE

DEMPSTER DUMPSTER® SYSTEMS

Dept. PI-9 DEMPSTER BROTHERS, Knoxville 17, Tennessee



1. Heavy-duty Signode strapping.
2. Fibreboard protectors.
3. Mechanical Brakeman snubber plates with fibreboard or chipboard protectors in place.
4. Strap supports.
5. Seals.

Signode controlled floating load method for shipping paper rolls

This is one of many Signode carload bracing methods now in general use. It depends for its success, first, upon Mechanical Brakeman plates, originally developed and patented by Signode, and secondly, upon many details such as placement of straps and plates about which your Signode representative can advise you. For expert assistance in damage free shipment of paper, consult a Signode paper specialist.

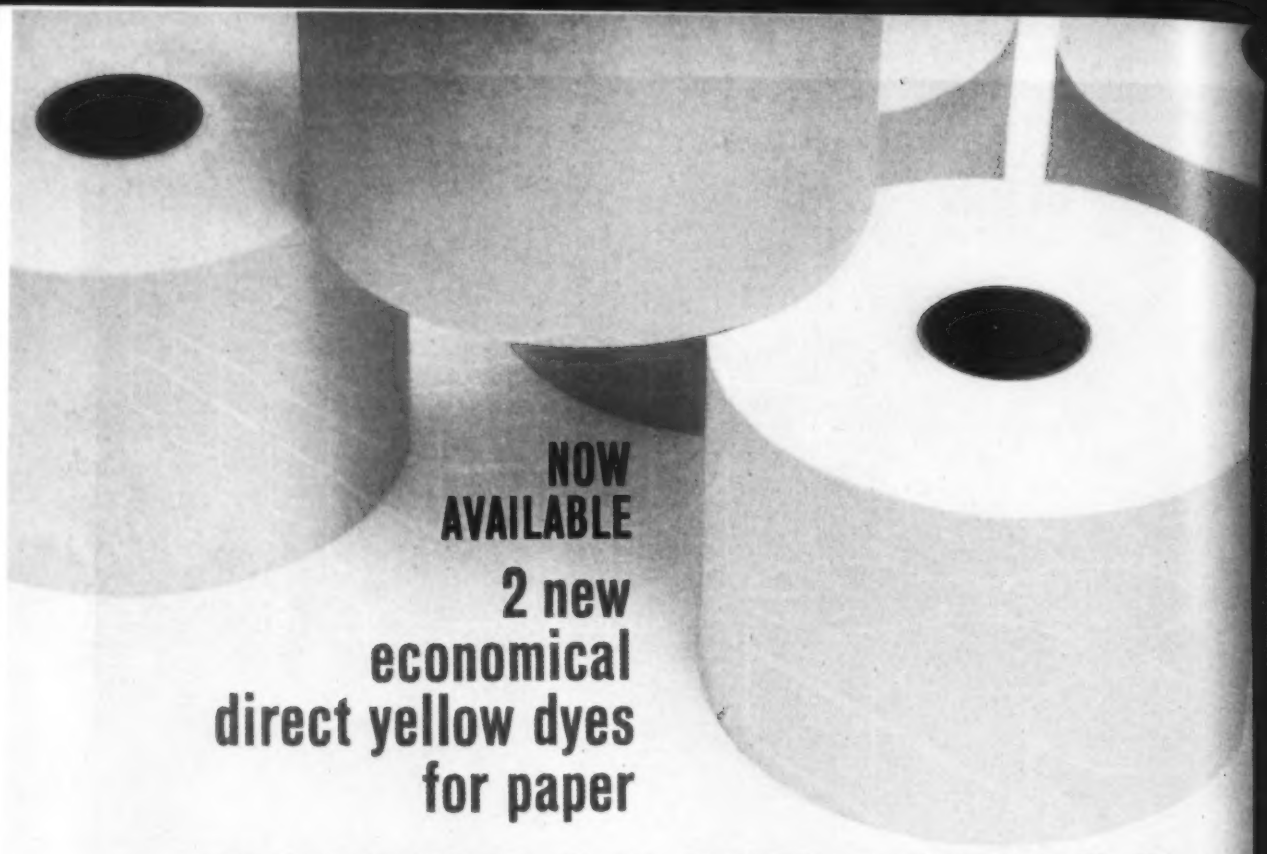
SIGNODE

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2632 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto



NOW AVAILABLE

2 new economical direct yellow dyes for paper

FASTUSOL® YELLOW RP
FASTUSOL® YELLOW RG

The dyes used in the coloring of paper add considerably to the cost of the finished sheet. GDC has now developed two new, low-cost, non-dusting direct yellows which offer all the benefits of a premium direct dye at minimum expense.

These new FASTUSOL YELLOWS produce extremely light-fast and bright greenish-yellow shades of the highest degree of even-sidedness. They are ideal for coloring all types of paper—bond, ledger, cover, text, etc.—both sized and unsized.

FASTUSOL YELLOW RP and RG are readily bleached with chlorine for simplified re-use of broke. They can be added dry to the beater without danger of showing color specks. They show no indication of burning-out or migration, hence being eminently suitable for coloring board dried at high temperature.

Try these dyes now in your furnish. The quality of our dyes is backed by the finest skilled technical service and prompt deliveries.

Write or call our nearest sales office for samples and additional information.

From Research to Reality

GENERAL DYESTUFF COMPANY

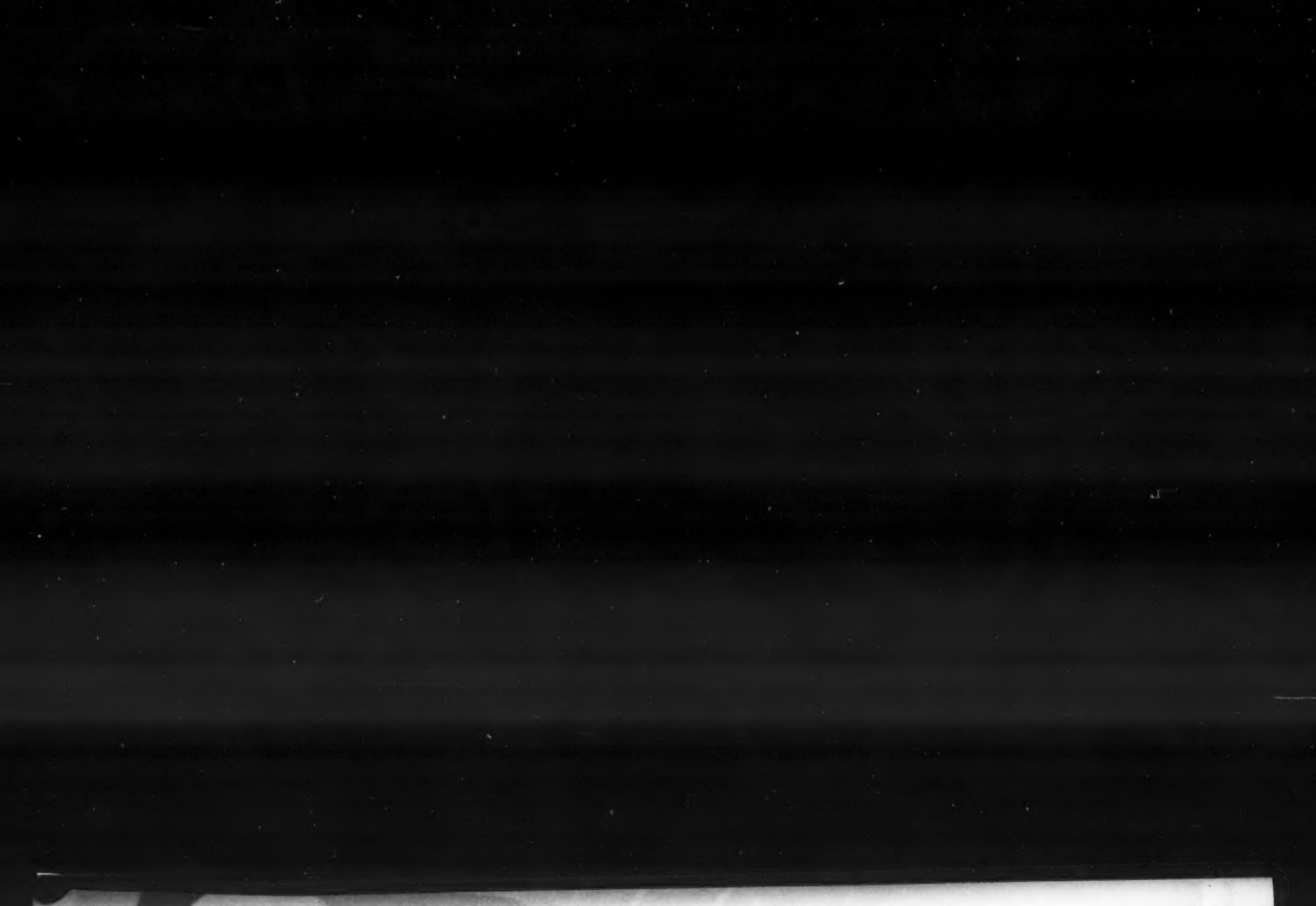
A SALES DIVISION OF

GENERAL ANILINE & FILM CORPORATION

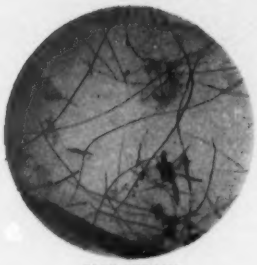
435 HUDSON STREET • NEW YORK 14, NEW YORK

CHARLOTTE • CHATTANOOGA • CHICAGO • LOS ANGELES • NEW YORK • PHILADELPHIA • PORTLAND, ORE. PROVIDENCE • SAN FRANCISCO • IN CANADA: CHEMICAL DEVELOPMENTS OF CANADA, LTD., MONTREAL.

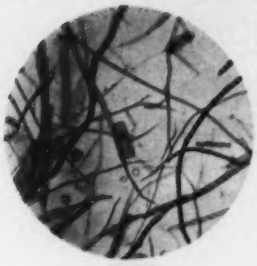
FASTUSOL YELLOW RP AND RG, MANUFACTURED BY GENERAL ANILINE & FILM, ARE SOLD OUTSIDE THE UNITED STATES AND CANADA UNDER THE TRADENAMES, "FERALUZ YELLOW RP AND RG," BY DISTRIBUTORS ALL OVER THE WORLD.



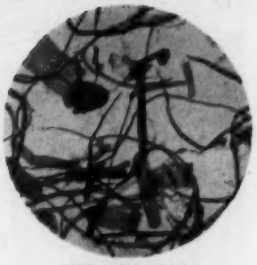
WHEAT STRAW



RICE STRAW

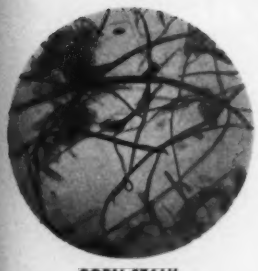


REEDS
(phragmites communis)

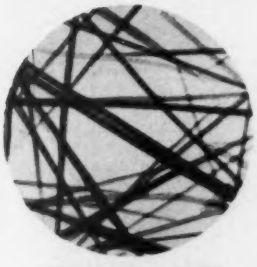


ELEPHANT GRASS
(before cleaning)

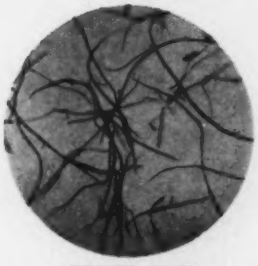
We build pulp and paper mills



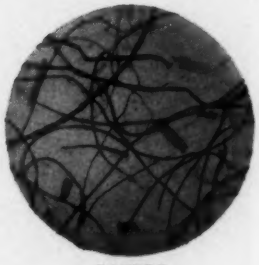
CORN STALK
(before depithing)



SUGAR CANE BAGASSE
(completely depithed)



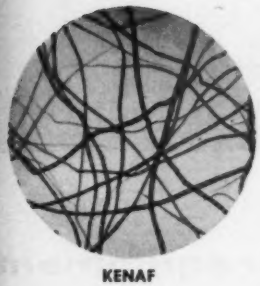
ESPARTO GRASS



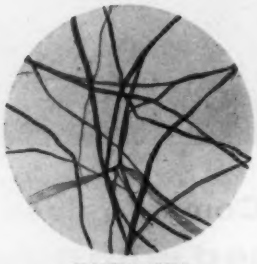
BAMBOO

around the world

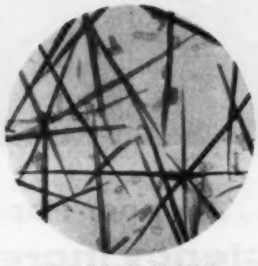
magnification:
approx. 35x



KENAF



MANILA HEMP



EUCALYPTUS SALIGNA

MONTEREY PINE

using these locally-abundant raw materials

Many countries have improved their economic position by making pulp and paper from locally-abundant grasses, woods and agricultural fibers. They began by having Parsons & Whittemore conduct a thorough technical and economic field survey. The selection of the proper process and equipment for use of such fibers is dependent upon many factors that can only be properly evaluated by highly-experienced personnel.

Field research is only one of Parsons & Whittemore's services. Our organization has world-wide technical, financial and machinery-manufacturing facilities that enable us to plan and supervise the designing, engineering, financing, construction and equipment of pulp and paper mills in any country having the required raw materials. We will even train local workers to operate the mill...and our branch offices will arrange for the sale of the plant's pulp and paper output on world markets. For information on any or all of these services, write to our nearest office.

THE PARSONS & WHITTEMORE / LYDDON ORGANIZATION

World leaders in the development of pulp and paper mills for the use of local fibers

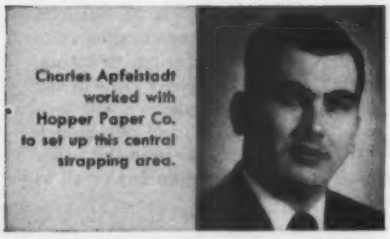
18-19 Savile Row, London W.1, England

5 Rue Jean Mermoz, Paris 8°, France

250 Park Avenue, New York 17, N.Y.

Check your AIM*... Hopper Paper Company does...

Strapping efficiency increased with power equipment



Charles Apfelstadt worked with Hopper Paper Co. to set up this central strapping area.

HOPPER PAPER COMPANY, TAYLORVILLE, ILLINOIS, producers of quality papers, worked with their Acme Idea Man to develop a modern, centralized station for strapping heavy skid-load shipments. They chose an Acme Steel A4 Pneumatic Steelstrapper suspended from an overhead mount. (Idea S3-51)

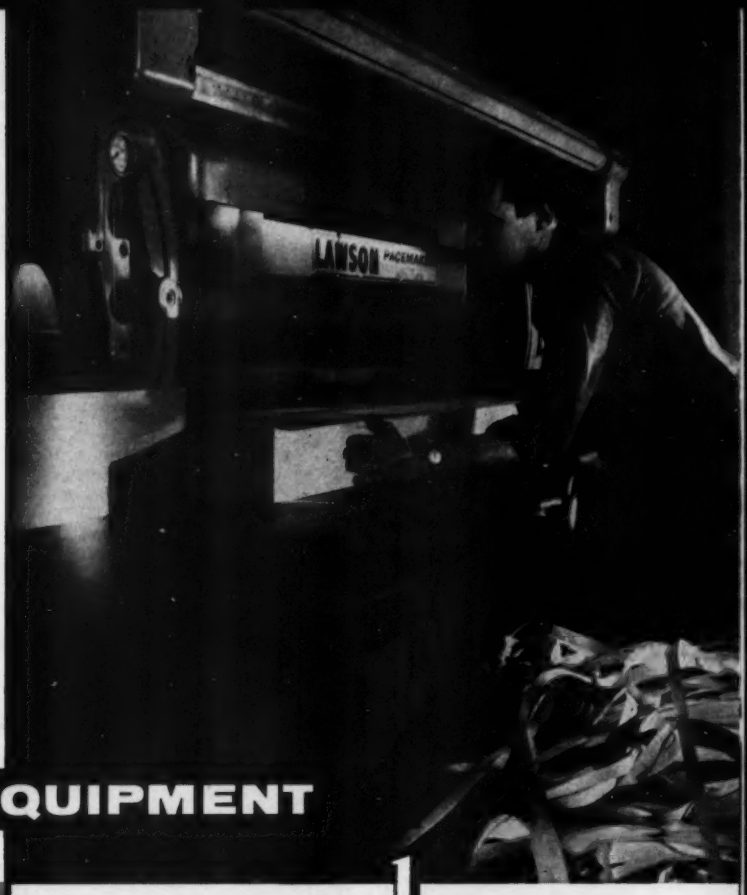
Combining the fully-powered A4 Pneumatic Steelstrapper with an E45 Overhead Mount lets operators easily reach and strap skids of paper in any part of the strapping area.

Through finger-tip control, the A4 power-tightens strapping to pre-determined tension, applies magazine-supplied seals, and cuts the strap at the seal. Since power does all the work, the last skid of the day is strapped as tight and secure as the first.

***Check your Acme Idea Man** for the latest strapping ideas. Or write Dept. PKS-99, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Limited, 743 Warden Avenue, Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

3 WAYS to improve finishing room efficiency... production...



LAWSON/DEXTER EQUIPMENT

2

DEXTER BRACKETT TRIMMERS speed cut-to-size operations. Finished work (paper, pads, tablets) are delivered to built-in belt conveyor, ready for packing and shipping. Hydraulic Clamp, automatic spacing stops and power sliding gauge for cutting precision. Especially productive in combination with Lawson Pacemaker Trimmers.

1

LAWSON PACEMAKER MILL TRIMMERS are 60% faster and almost 20% heavier than comparable machines. Straightline knife action—truly cushioned *flexible* clamp—rear slot closing device—optional Electronic Spacer... give added efficiency and accuracy to finishing operations.

3

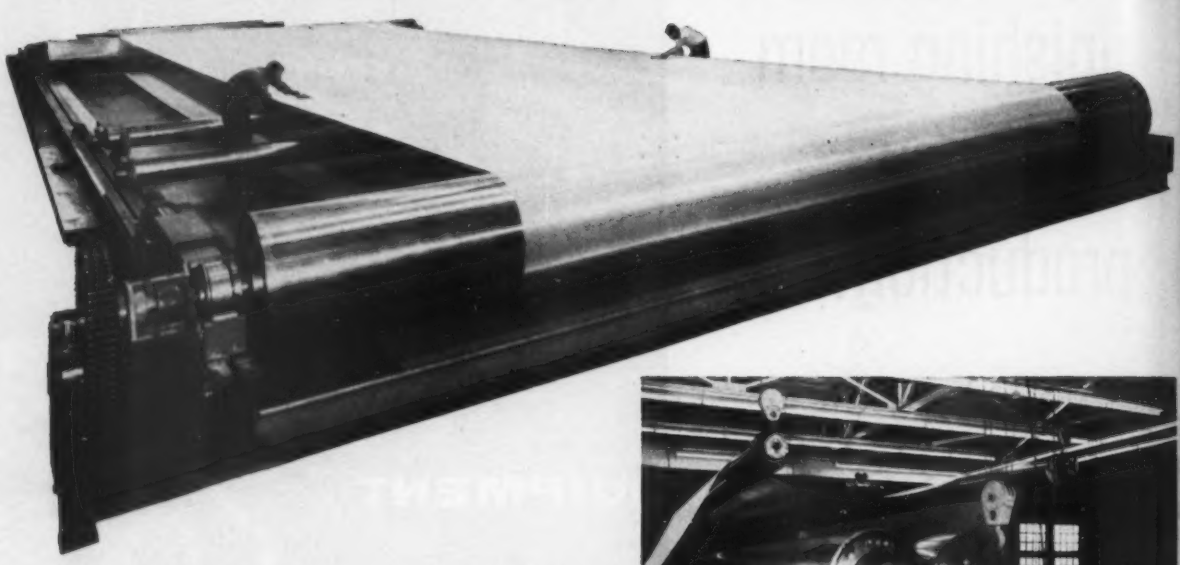
LAWSON HI-SPEED DRILLING MACHINE drills, or drills and slots in one operation, two or more holes in a full 2¼" lift in just two seconds! Drills come down to work, fixed table construction keeps paper in perfect alignment for unmatched accuracy.

Write or call for full information

DEXTER/LAWSON

DIVISIONS OF MIEHLE-GOSS-DEXTER, INC.
CHICAGO 8, ILLINOIS

In specialized applications...
ACIPCO CENTRIFUGALLY SPUN STEEL TUBES



Appleton Wire Works, Inc., manufactures high quality fourdrinier wires for paper making machines. These fine-mesh wires are woven in widths up to 340 inches and lengths over 180 feet.

At its Montgomery, Alabama, plant, Appleton Wire Works, Inc. uses ACIPCO steel tubes— centrifugally spun and polished at Acipco—as stretch rolls on the huge finishing table. These 35.625″ OD, 410″ long rolls must be both dimensionally stable and balanced and must have a polished surface which will not affect the delicate woven wire surface mechanically or chemically.

Here is another example of Acipco versatility. If your application requires heavy wall steel or alloy iron tubes with special physical, chemical or metallurgical properties "built-in," Acipco can serve you. Investigate Acipco's complete "one source—from start to finish" facilities. A call or letter will bring full information on Acipco centrifugally spun tube applications in your field.

VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

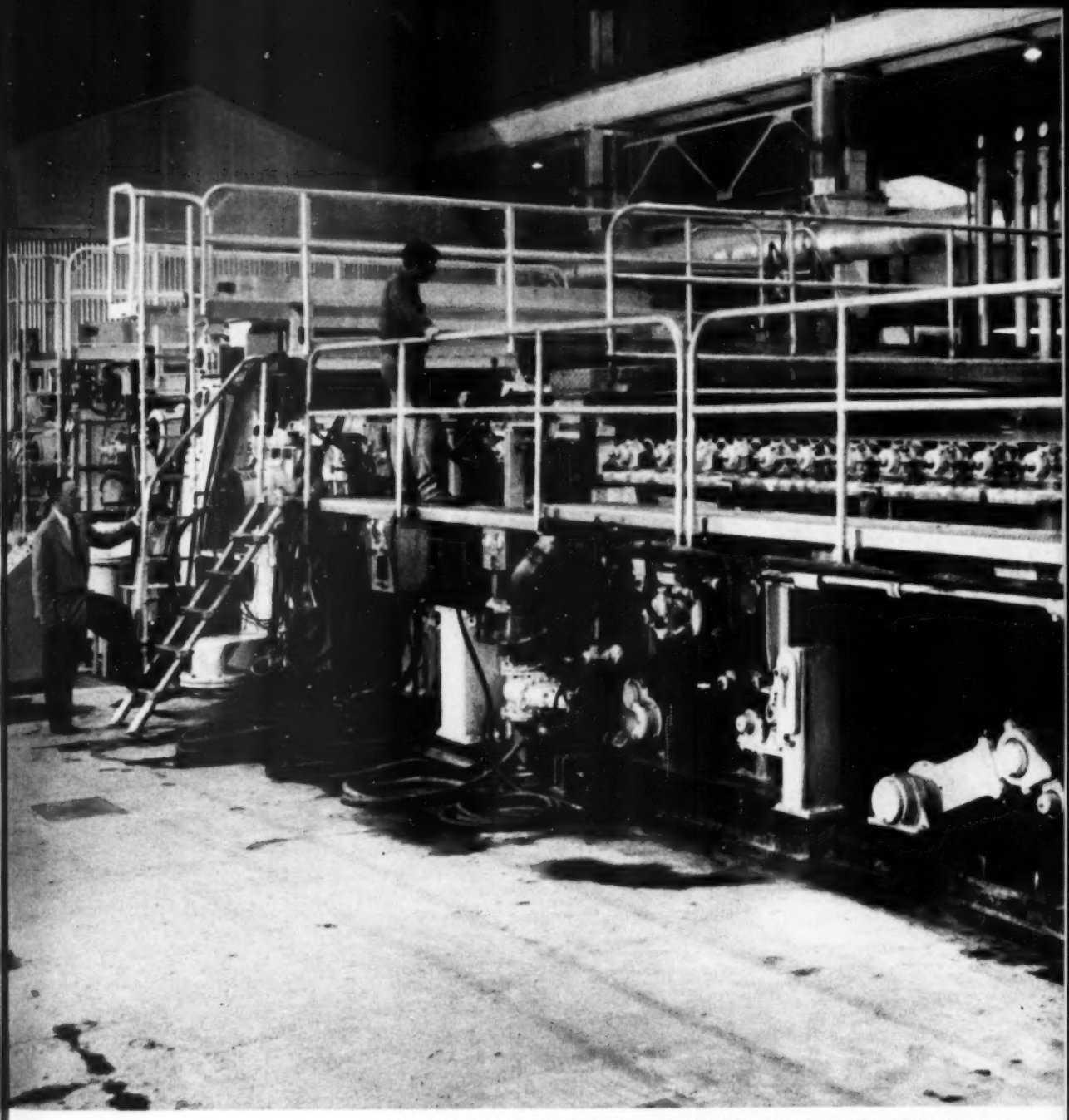
Size Range: Lengths up to 410″ to meet modern machinery requirements have been produced. OD's from 2.25″ to 50″; wall thicknesses from .25″ to 4″.

Analyses: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special non-standard analyses.

Furnished: As cast, rough machined, or finished machined, including honing. Complete welding and machine shop facilities for fabrication.

SPECIAL PRODUCTS DIVISION
AMERICAN CAST IRON PIPE CO.
BIRMINGHAM 2, ALABAMA

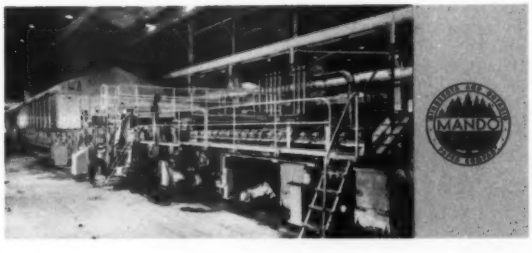
ACIPCO



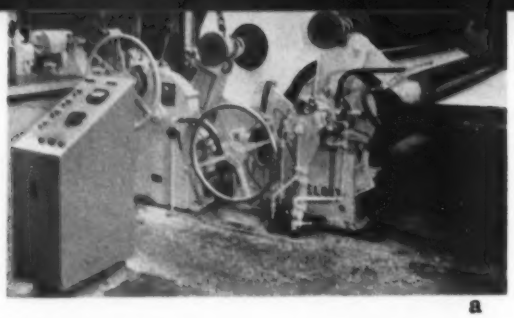
L. R. CHRISTENSEN

Minnesota & Ontario Paper Company Number 2 Machine, International Falls, Minnesota

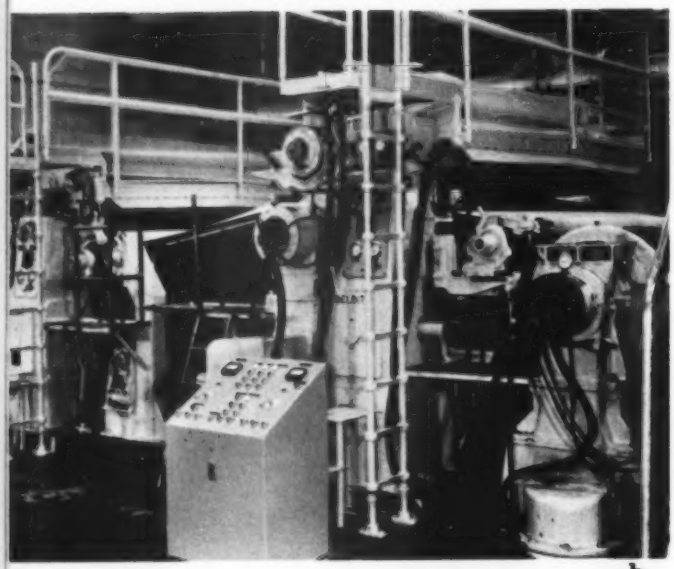
Minnesota & Ontario Paper Company



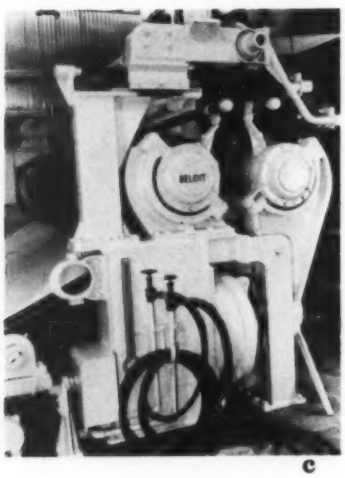
MANDO'S new 158″ publication grade machine marks the completion of an extensive modernization program at International Falls. For details of this versatile, new machine, especially designed for a wide range of publication grades, please turn the page.



a

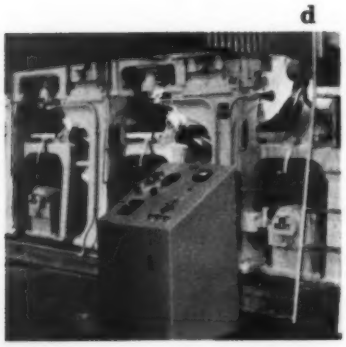


b



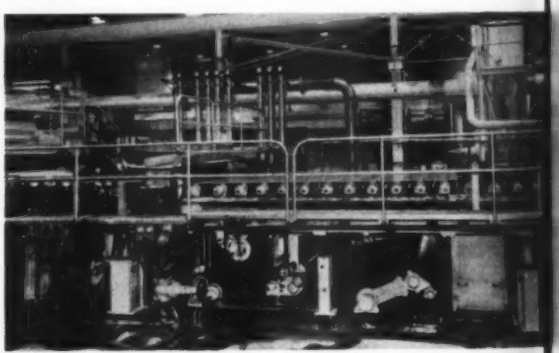
c

d



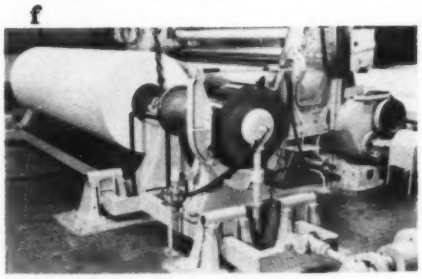
. . . some features of Mando's new Beloit 158" publication grade machine pictured on the preceding page

The start-up of the new No. 2, 158" Beloit machine now brings MANDO'S production at International Falls to 270 tons per day. This versatile machine, for publication grades, is designed for operating speeds in the 1500 fpm range. Pictured on this page are some of the machine's features: (**a**) transfer type reel; (**b**) straight-through suction presses, suction couch, and plain smoothing press; (**c**) Beloit horizontal size press—located between second and third dryer sections; (**d**) dryer section—enclosed gear-type drive, antifriction bearings serviced by Beloit roll filter lubrication; (**e**) 158" Beloit removable, shakable Fourdrinier; (**f**) oscillating unwind stand and water-cooled brake.



e

f

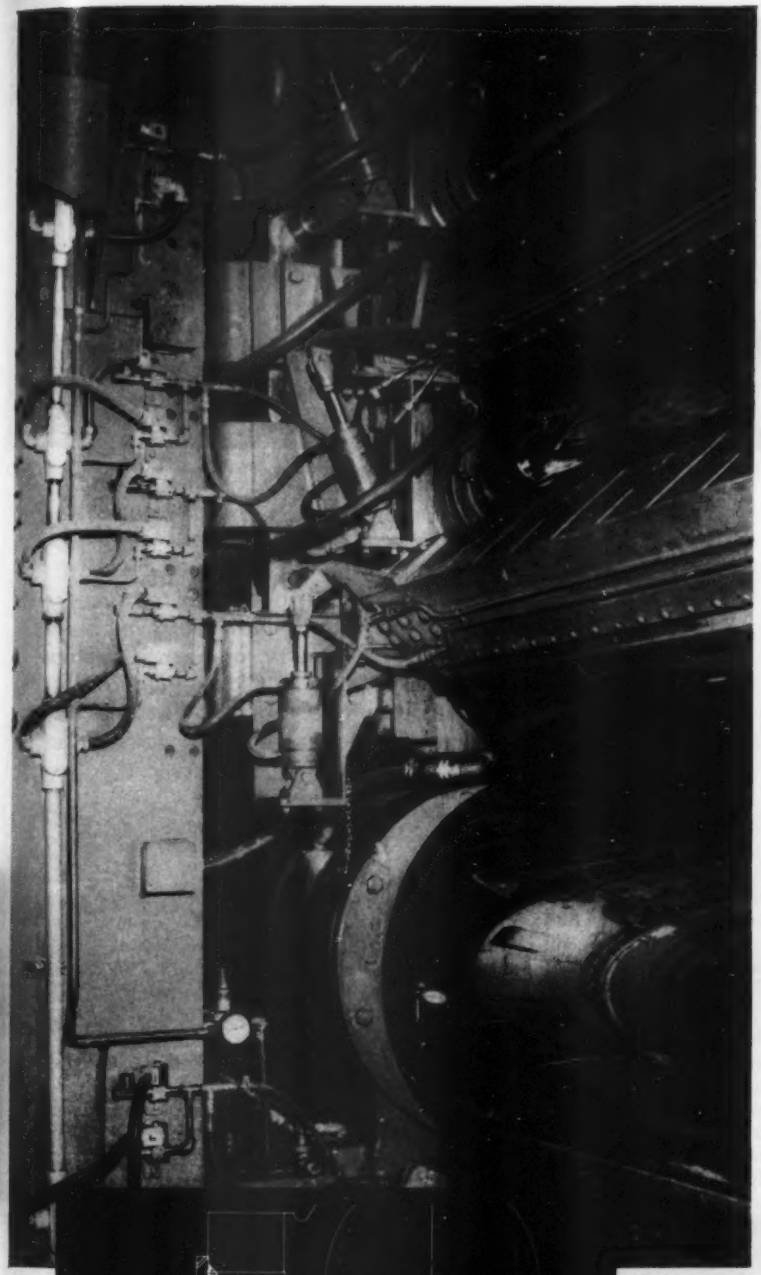


BELOIT IRON WORKS PAPER MACHINERY BELOIT, WIS. U.S.A.

BELOIT

PAPER MACHINERY

your partner in papermaking



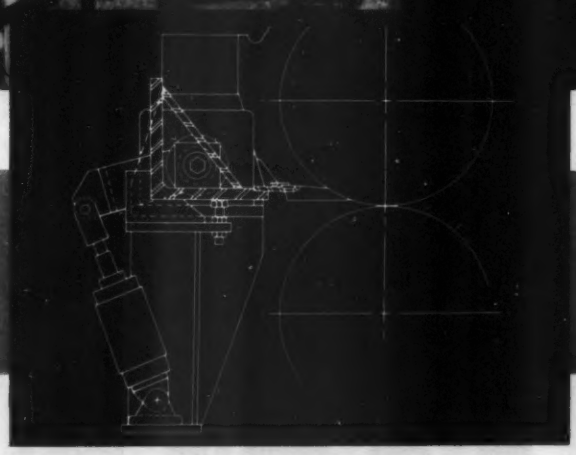
Clean rolls and Lodding Doctors

CLEAN ROLLS go hand in hand with Lodding Doctors. Mills throughout the country and many abroad have found this to be so — just as in the installation of calender doctors at the Chillicothe Paper Company.

There's good reason for such universal reliance on Lodding. Most mills prefer to turn the intricate problems of doctoring over to specialists, where *each* doctor is custom engineered and precision built for *each* machine roll application.

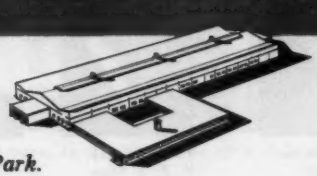
Calender rolls are among the most difficult to doctor properly, yet among the most important. Thirty years of specialized experience with thousands of calender doctor applications stand behind Lodding's ability to lick even the most exacting problems presented.

For example, Lodding Calender Doctors are designed for mounting on the roll bearing housings to enable the doctor to ride with the roll at all times. This provides constant, uniform blade pressure with perfect alignment to the axis the entire face length of the roll. Doctor backs are built to individual specifications to provide the necessary strength and rigidity and, among other factors, to compensate for the roll crown. Clean nips result, allowing a free course for the sheet.



If proper calender doctoring — any other roll doctoring — is your goal, better specify Lodding.

LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS



We welcome your inspection of our new plant located in Worcester's Auburn Industrial Park.

Feature articles

Buckeye's Foley Mill ups capacity to 200,000 tons of dissolving pulp

Among the major equipment contributing to the successful operation of this mill are: Sandy-Hill fourdrinier and pulp dryer; Babcock-Wilcox recovery unit and cyclone evaporator; Impco bleach system and double screening system; Dorr-Oliver recausticizing system; and Bird Machine continuous centrifugal filters for lime mud dewatering.

BUCKEYE CELLULOSE Corporation's new pulp mill brings the Foley annual capacity to 200,000 tons of dissolving pulp or 266,000 tons of paper pulp.

The new mill is integrated with the original mill in a semi-independent parallel arrangement. While both are linked department-by-department, either mill can operate independently and produce the same or a different grade of pulp from that of the other mill. Design and engineering of the new mill incorporate a maximum flexibility to meet customer requirements.

Dissolving pulp produced at the combined mills will go mainly into the new Tyrex tire cord, viscose, rayon and cellophane. Kraft pulp will be used in boxboard, tissue and napkin stock, printing papers, magazine papers, glassine and special foodboard.

In planning and constructing the new mill, major attention was given to the construction management technique employed by Buckeye, with the result that a 10 per cent saving in construction cost and a relatively trouble-free start up were realized.

The new construction management technique involved (1) breaking the engineering and construction phases into different components which were handled by different engineering firms or contractors; (2) company and contractor personnel were jointly assigned to the key managerial positions in both the engineering and construction phase of the project; and (3) Buckeye and contracting firms assigned full-time personnel to all positions of responsibility on the project.

Thus, in accordance with item (1), Lumus Co. of New York designed and constructed water treatment, digesting, washing and screening, pulp drying and finishing operations; Sargent and Lundy Co. of Chicago was responsible for the design of the power plant; and Triangle Construction Co. designed and constructed the wood yard, causticizing and evaporator operations and also constructed the power plant.

Among the outstanding features incorporated into the new mill are: (1) a high rate of chemical recovery largely due to a unique arrangement of spraying the 65 per cent circulated liquor and the 50 per cent makeup liquor into the twin scrubber section through separate headers; (2) a specially designed ring barker for debarking hardwoods which make up 10 to 20 per cent of all pulpwood used; (3) a seven-stage bleaching system including two chlorine dioxide stages, and pro-

W. L. Lingle, Jr.
President

P. K. Honey
V. P. & Mgr.

O. H. Alderks
V. P. Research

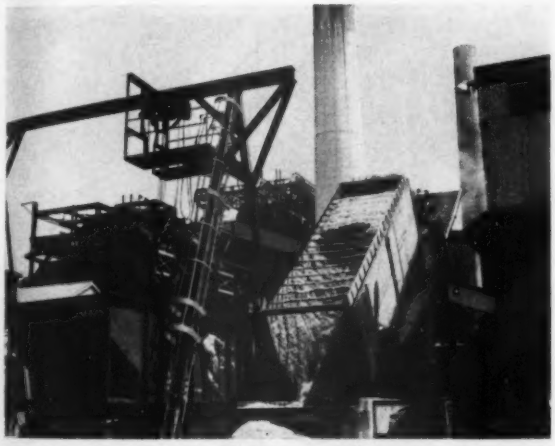
C. B. Metry
V. P. Sales

G. A. Togas
Mgr. Fla. Operations

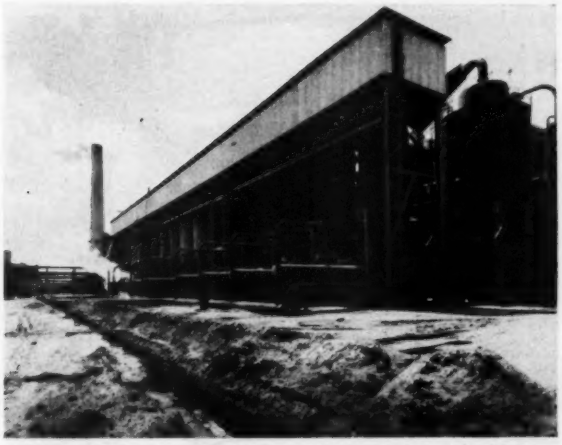
O. L. Wakeman
Mill Mgr.

Continental Gin Co.'s conveying equipment conveys logs and chips.

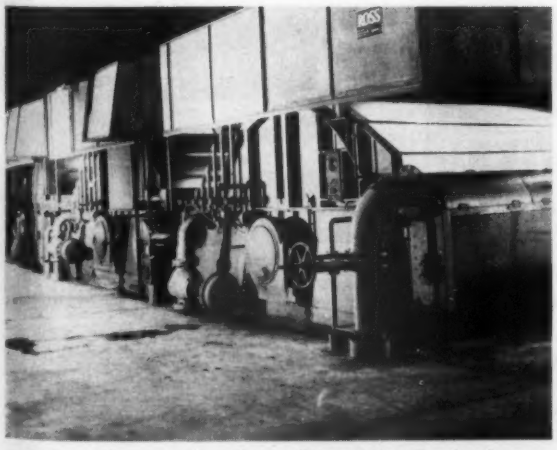
Impco's specially designed barker for barking hardwood logs.



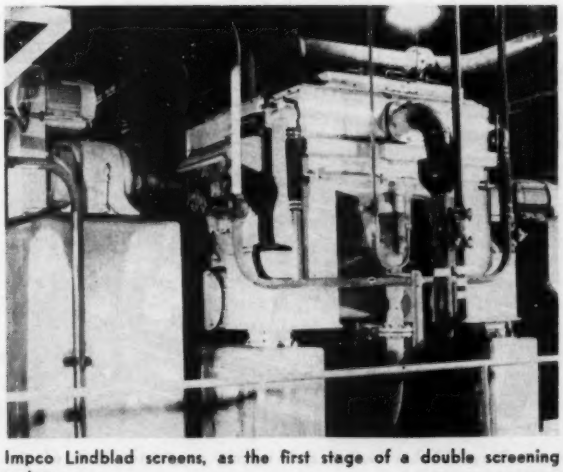
Screw Conveyors Corp.'s hydraulic truck dumper handles sawmill chips.



Chicago Bridge & Iron Works 4,150 cu. ft. stainless clad digesters.

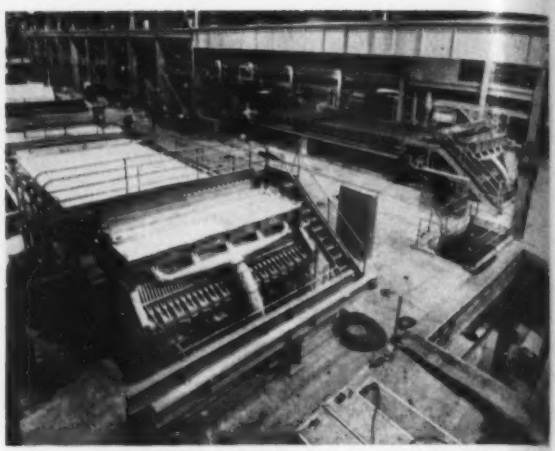


Impco brown stock washers and Ross Engineering hood.

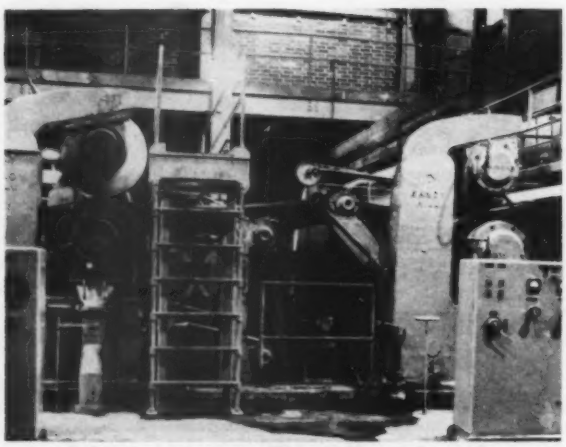


Impco Lindblad screens, as the first stage of a double screening system.

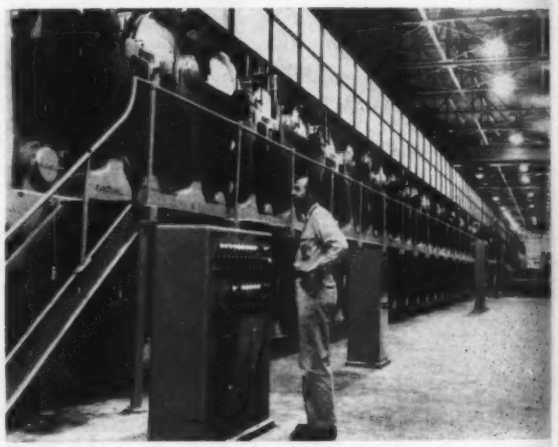
Impco 9½ ft. dia. by 14 ft. stainless steel bleached stock washers.



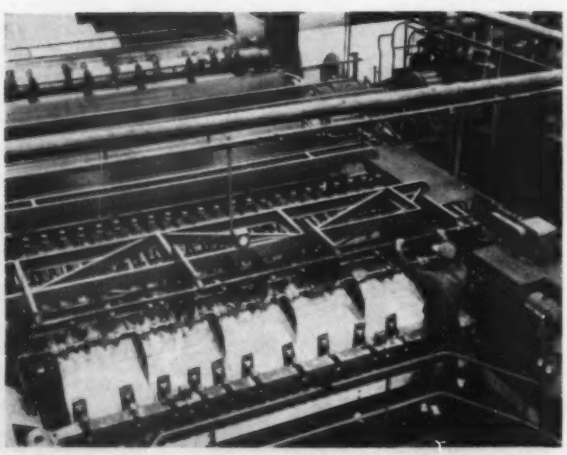
Sandy Hill fourdrinier with multiple manifold distributor.



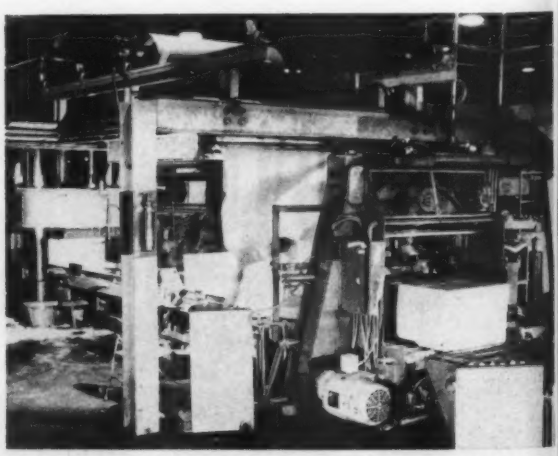
Sandy Hill straight through press and predryer rolls.



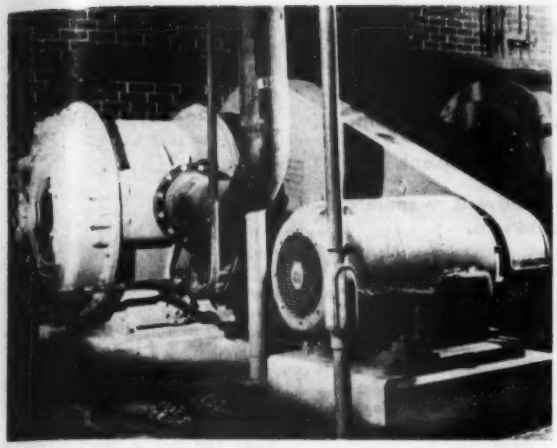
Sandy Hill dryer section and Ross Engineering air system and hood.



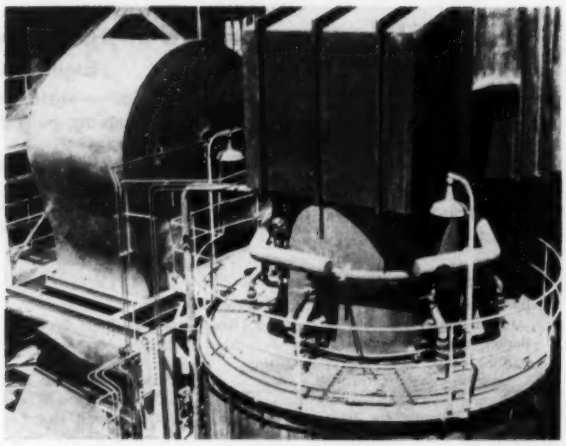
Lamb-Grays Harbor cutter and layboy constitutes part of the finishing equipment.



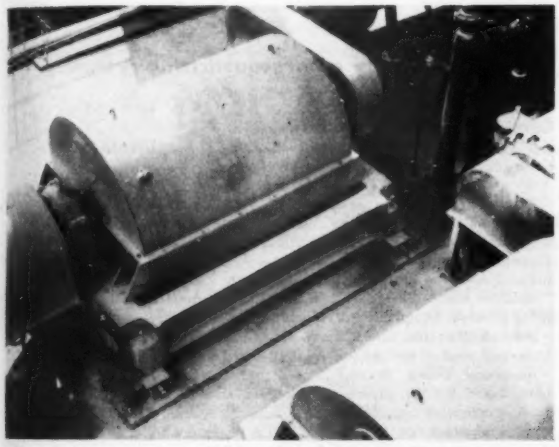
Washington Iron Works 2,600-ton hydraulic press and Tennant Twist Lock wire Tying machines.



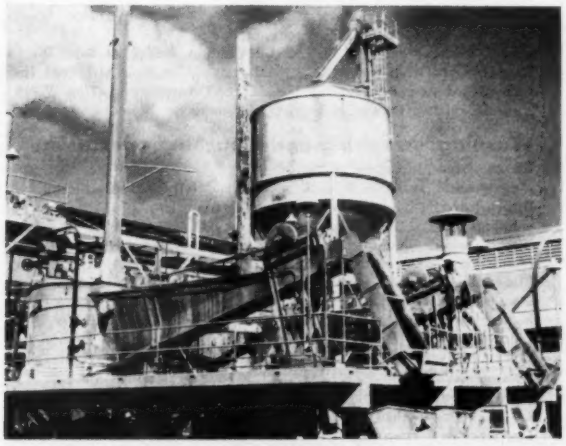
Nash Engineering Hytor vacuum pumps driven by a 1000-hp. motor.



Babcock-Wilcox scrubber-cyclone evaporator as part of the 550-ton recovery unit.



Bird Machine Co. centrifugal filters are used to dewater lime mud.



Dorr-Oliver No. 10 type lime slaker of stainless steel construction.

vision for improved control of temperature and concentrations of bleaching chemicals; (4) a unique double screening system which effectively removes all undesirable particles prior to bleaching; and (5) the use of continuous centrifugal filters for lime mud dewatering.

Woodyard operations

A new log conveyor carries logs to a three-section, 12-ft.-dia. by 67 ½-ft.-long, chain-suspended barking drum. The drum has two dry sections which are driven by a 150 hp. motor and a wet section driven by a 100 hp. motor through fluid drives.

The barked logs are discharged to a new sorting belt while the bark drops through opening between M-bars into a circular vat and then discharges to a conveyor. Surplus bark is conveyed to a 78 HS bark burner equipped with two 7½ hp. forced draft fans. The burner is 84 ft. high and has a base dia. of 78 ft.

A specially designed ring barker is used to debark recycled hardwood which is incompletely barked in the drum barker. The hardwood enters the ring barker from a variable speed accumulator.

Other new equipment in the woodyard operation include a chip silo, a bark hog, and bulk chip handling facilities. The latter consist of a hydraulic truck dumper, a rail car shaker, a receiving pit, a take-away conveyor, and a 7,800 sq. ft. concrete storage mat.

Five digesters added

Five new 4,150-cu.-ft.-capacity digesters were added bringing the Foley mill's total number of digesters to 14. The digesters are stainless steel clad. Each digester is equipped with an indirect liquor heater and a liquor circulating pump.

Pulp is blown from the digesters into a 24-ft.-dia. by 34-ft.-high, two-charge blow tank equipped with entrainment separator, an internal direct contact condenser and a heat accumulator tank. The accumulator tank has two heat exchangers and a water pump.

An interesting feature of the digester system is the integrated heat recovery and the automatic cooking liquor preparation systems.

Washing, screening and bleaching

Knots are removed from the pulp stock by three Jonsson screens supplied by a stock pump which is V-belt driven through a Dynamatic variable speed coupling and controlled by a new magnetic-type flow controller.

Principal equipment and suppliers of the new Buckeye, Foley, Fla., mill

Engineering Contractors:

Lummus Co. — water treatments, digesting, washing and screening, pulp drying, finishing operations.

Sargent & Lundy Co. — power plant.

Triangle Construction Co. — woodyard, evaporators, causticizing operations.

Woodyard operations

Bark burner, 78-HS type, equipped with two 7½ hp forced draft fans ..... Rees Burner & Blow Pipe Co.
Barker, ring type for hardwood ..... Improved Machinery Inc.
Barking drum, 12-ft. dia., 67½-ft. long, 3-section, chain suspended ..... Fibre-Making Processes Inc.
Bark hog ..... Diamond Iron Works
Conveyor system, for logs and chips ..... Continental Gin Co.
Hydraulic truck dumper, Kewaunee ..... Screw Conveyor Corp.
Rail car shaker ..... Link Belt Co.

Digesting

Accumulator tank, equipped with two heat exchangers ..... Chattanooga Boiler & Tank Co.
Blow tank, 24-ft. dia. 34-ft. high, equipped with entrainment separator ..... Hammond Iron Works
Digestors (5), 4,150-cu. ft. capacity, stainless steel clad ..... Chicago Bridge & Iron Works
Digester circulating pumps ..... Goulds Pumps Inc.
Indirect solution heaters ..... Downingtown Iron Works
Solution mixing tank ..... Chattanooga Boiler & Tank Co.

Washing, screening and bleaching operations

Bleach system, including all major equipment ..... Improved Machinery Inc.
Bleach towers (8), steel construction with tile linings ..... Graver Tank & Mfg. Co.
Bleach tower linings ..... Chemical Linings Inc.
Blend chest, tile constructed ..... Chemical Linings Inc.
Bleached stock washers (7), 9½-ft. dia. by 14-ft., stainless steel construction ..... Improved Machinery Inc.
Brown stock washers ..... Improved Machinery Inc.
Chlorine dioxide mixers, Hasteloy C ..... Improved Machinery Inc.
Chlorine mixers (2), rubber lined ..... Improved Machinery Inc.
Jonsson screens (3) ..... Bird Machine Co.
Kamyr knotter stock pump ..... Sandy Hill Iron & Brass Works
Liquor storage tanks ..... Chattanooga Boiler & Tank Co.
Magnetic flow controller ..... Foxboro Co.
Pump motors ..... Allis Chalmers Mfg. Co.
Pumps, liquor and white water ..... Goulds Pumps Inc.
Pumps, stock ..... Allis Chalmers Mfg. Co.
Pumps, stock ..... Sandy Hill Iron & Brass Works
Pumps, high density tower, mining, No. 8, Class SL Double Suction, of 317 and 316 stainless steel construction ..... Buffalo Pumps, Div. of Buffalo Forge Co.
Screening system, double screening system consisting of eight Lindblad screens, a flat screen, and four centrifugal screens ..... Improved Machinery Inc.
Steam mixers (5), 500-ton capacity in bleach system ..... Improved Machinery Inc.
Stock storage tanks (2), tile constructed, 50-ton capacity of high-density stock ..... Chemical Linings Inc.
Washer hoods and ventilating systems .... J. O. Ross Engineering Co.
White water chest, tile construction ..... Chemical Linings Inc.

Pulp drying and finishing

Air system, including machine hood ..... J. O. Ross Engineering Co.
Bale stackers and conveyors ..... Lamb-Grays Harbor Co. Inc.
Backstands ..... Lamb-Grays Harbor Co. Inc.
Breaker stack, designed for 1000 lb. nip pressure, equipped with hydraulic lifting and loading ..... Sandy Hill Iron & Brass Works
Cutter and layboy ..... Lamb-Grays Harbor Co. Inc.
Dryers (65), 61 of 60-in. dia., one of 36-in. dia., and three suction air cooled of 60-in. dia. ..... Sandy Hill Iron & Brass Works
Fourdrinier, 180-in. wide wire, equipped with 64-pass multiple manifold distributor, suction couch, oscillating suction boxes, etc. ..... Sandy Hill Iron & Brass Works
Helper drives (2), 15 hp on 3rd press and breaker stack, with Magamp controls ..... Westinghouse Electric Corp.
Hydraulic bale press, 2,600 ton ..... Washington Iron Works
Magna cleaners (2), 36-in. dia. ..... Bauer Bros. Co.
Motor, 1000 hp on vacuum pumps ..... Allis Chalmers Mfg. Co.
Motor, 400 hp, for machine drive, force ventilated, dc motor, with Magamp control ..... Westinghouse Electric Corp.
Press section, straight-through press, consisting of 1st suction wet press, four 60-in. predryers, 2nd suction wet press, and smoothing press ..... Sandy Hill Iron & Brass Works
Pulp machine drive, line shaft ..... Sandy Hill Iron & Brass Works
Reel, Roll Master, constant pressure and constant speed ..... Sandy Hill Iron & Brass Works
Stock chests, tile construction ..... Chemical Linings, Inc.
Vacuum pumps (4), Hytor, driven in line by a 1,000 hp synchronous motor ..... Nash Engineering Co.
Vortraps ..... Nichols-Freeman
Wire tying machines (2), Twist Lock, automatic, designed to handle single or multiple bales ..... Tennant, Sons & Co.

Chemical recovery and recausticizing systems

Agitator, AP paddle type, for lime-mud storage tank ..... Dorr-Oliver, Inc.
Causticizers (3), No. 15, caustic type, with drives ..... Dorr-Oliver, Inc.
Centrifugal filters (2), continuous, one for dewatering lime mud and one on lime sludge from water softening system ..... Bird Machine Co.
Evaporators, five effect ..... Chicago Bridge & Iron Works
Evaporator pumps ..... Worthington Corp.
Evaporator control panel ..... Bailey Meter Co.
Induced draft fan for Venturi scrubber, with stainless steel rotors ..... American Blower Corp.
Kiln, oil-fired, equipped with variable-speed induced draft fan ..... Allis-Chalmers Mfg. Co.
Lime-mud washer mechanism, ATBHB type, with motorized lifting device ..... Dorr-Oliver, Inc.
Lime slaker, No. 10, caustic type, stainless steel construction ..... Dorr-Oliver, Inc.
Oxygen analyzer, on lime kiln ..... Bailey Meter Co.
Recovery boiler, 550-ton capacity, 285,000-lb/hr. steam output, equipped with economizer, tubular gas heater, scrubber-cyclone evaporator, and shot-cleaning system ..... Babcock & Wilcox Co.
Recovery boiler-control system, consisting of total air-flow control; total air-primary air ratio control; tertiary air control; three-element feed water control; furnace draft control; oxygen and combustibles recorder ..... Bailey Meter Co.
Shot cleaning system ..... Diamond Power Specialty Co.
Soot blowers ..... Diamond Power Specialty Co.
Stack, concrete, brick lined ..... Rust Engineering Co.
Tanks, including three 15-ft. dia., 10-ft. deep causticizer tanks; a 40-ft. dia., 24-ft. deep white-liquor clarifier tank with 3 balanced trays; a 35-ft. dia., 24-ft. deep lime-mud washer tank with 3 trays; a 20-ft. dia., 20-ft. high lime-mud storage tank; and a 20-ft. dia., 20-ft. high water-treatment sludge tank .... Hammond Iron Works
Turbine for induced draft fan, 2,700 hp, back pressure type, multi-valve, multi-stage ..... General Electric Co.
Venturi scrubber-cyclone evaporator, twin section type, with separate headers for 50% and 65% black-liquor solids ..... Babcock & Wilcox Co.
Venturi scrubber control and cyclone black-liquor density control ..... Bailey Meter Co.
White-liquor clarifier mechanism, type A3TB, with motorized lifting device ..... Dorr-Oliver, Inc.

Instrumentation

Butterfly valves ..... Continent Equipment Co.
Flow recorders, some temperature recorders, gas analyzers, computing relays, manual loading stations, positioners ..... Bailey Meter Co.
Instrument air compressors ..... Gardner-Denver Co.

Multi-point temperature recorders ..... Minneapolis-Honeywell Regulator Co.
Pneumatic temperature transmitters ..... Moore Products Co.
Process instrumentation ..... Foxboro Co.
Standard control valves, consistency regulators .... DeZurik Company

Other equipment

Air compressors (3), two 100 psi, size 9×9 horizontal, single cylinder, watercooled carbon piston and ring, for instrument air supply; one "W" type, two-stage watercooled, Model WBR, 25 hp., for general mill air supply ..... Gardner-Denver Co.
Air compressor, 100 psi., horizontal, single cylinder, single stage, driven by a 100 hp motor ..... Worthington Corp.
Chlorinizers, Model CVS-A ..... B-I-F Industries Inc.
Feeders (3), pneumatically paced, continuous, for water-treatment system ..... Omega Machine Co. Div. of B-I-F Industries Inc.
Ion exchange units, anion and cation exchange units ..... Graver Tank & Mfg. Co.
Lime-water softener, with automatic desludging controls ..... Graver Tank & Mfg. Co.
Motors, electric, over 200 hp ..... Allis-Chalmers Mfg. Co.
Motors, electric, Life-Line A type, with Mylarn and Bondite insulation, 1-200 hp. ..... Westinghouse Electric Corp.
Pumps (2), 10,000-gpm. main-mill water pumps .... Goulds Pumps Inc.
Pumps, well ..... Layne & Bowler Inc.
Pumps, filter supply ..... Allis-Chalmers Mfg. Co.
Recarbonators ..... American Well Works
Silactors (3), Series A-736, on water-treatment system ..... Wallace & Tiernan Inc.
Substations (15), for electrical distribution .... Allis-Chalmers Mfg. Co.
Turbine generator, 10,000 KW, non-condensing .. General Electric Co.

This screening operation ahead of the brown stock washers, increases washing efficiency, improves black liquor recovery and assures better and more uniform vacuum on the washers.

Following the brown stock washers, stock is screened in a unique double screening system, which includes six primary and two secondary Lindblad vibrating screens, a flat screen and four centrifugal screens. Screened stock is thickened in a valveless decker, driven through a Dynamatic variable speed coupling, and is then pumped by a thick stock pump to two 50-ton, high-density storage towers. From here it goes to an agitated blend chest where its consistency is adjusted prior to bleaching.

The seven-stage bleach system, including two chlorine dioxide stages, features eight tile-lined, steel bleach towers (two low density upflow chlorine towers and six high density downflow towers) and seven 9½-ft.-dia. by 14-ft.-face stainless steel washers.

Prior to entering the chlorine towers, stock passes through two rubber-lined chlorine mixers. Following each washing stage and prior to entering each succeeding bleach stage, stock passes through a total of five 500-ton, stainless steel steam mixers, two Hastelloy C chlorine dioxide mixers, and two 500-ton, thick-stock pumps.

Stock from the bleach plant is stored in two 42-ft.-dia. by 43-ft.-high, storage tanks of tile construction.

Pulp drying machine

Following the bleaching operation, stock is passed through two 36-in. Magna cleaners and then through a system of Vortraps. It is thickened on a valveless decker and stored in a tile-constructed stock chest.

The 180-in.-wide pulp drying machine, designed for speeds of 150 to 500 fpm, is identical with the one installed at Foley in 1954. It features a corrosion-resistant removable fourdrinier equipped with a 64-pass Bertram multiple manifold distributor designed for recirculation of stock, rubber-covered table rolls, a suction couch roll, oscillating suction boxes, a wire tension indicator, oscillating showers, and a 30-in. lumpbreaker roll equipped with adjusting arms and pneumatic lifting and loading cylinders.

The press section consists of a first section wet press, four 60-in. predryers, a second suction wet press and a smoothing press. They are straight through presses, designed for heavy duty and high nip pressures, and are equipped with control panels for hydraulic loading equipment. Press arms are cast of ductile iron and press framing designed for ease of felt changing.

Felt rolls are covered with hard rubber. The vertical felt stretcher is operated by an air motor.

Vacuum in the suction boxes, couch roll, and suction presses is provided by four Hytor vacuum pumps driven in line by a single 1,000-hp synchronous motor.

The drying section consists of a 36-in.-dia. lead dryer, 48 dryers of 60-in. dia. in the first section, a breaker stack, and 13 dryers of 60-in. dia. in the second section followed by three 60-in. suction, air-cooled dryers of a new design, two heavy duty solid chilled iron draw rolls and a Roll Master constant-pressure, constant-speed reel.

Non-oscillating doctors with quick lift mechanisms are installed on the first five dryers and on the last top dryer in each section.

The breaker stack is designed for a nip pressure of 1000 lb. per inch. It features hydraulic lifting and loading and is equipped with a felt expander roll.

The pulp drying machine drive consists of a selective line shaft drive driven by a 400-hp force ventilated dc motor. The power supply for this motor consists of a 300 KW generator and a 13.8 KW exciter, mounted on a common bed plate and driven by a 450 hp. synchronous motor. Two 15 KW lineshaft-driven generators supply current for two 15 hp. gearmotors which serve as helper drives on the third press and on the breaker stack.

Finishing operation

Finishing equipment includes a number of backstands, a cutter and layboy, a roll winder, a 2,600-ton hydraulic press, two automatic Twist Lock wire-tying machines, separated by an automatic turn table, various bale conveyors, and a bale stacker.

The wire-tying machines are designed to handle single or multiple unit bales requiring 4 to 6 wires at a rate of 120 bales an hour. The machines are fully automatic. They will accept the wrapped bale, locate it for the required wire placing and pass it to the turntable. The turntable automatically rotates it through an angle of 90° and passes it to the second wire-typing machine which repeats the wire-tying operation and passes it to the discharge conveyor which supplies the bale stacker.

Chemical recovery and recausticizing system

Buckeye's new chemical recovery system promises a recovery efficiency of 95 per cent under normal operating conditions. Major components of this system are a 550-ton-capacity recovery unit with a rated steam output of 285,000 lb/hr at 600 psi and 750°F coupled with a Venturi scrubber-cyclone evaporator replacing the electrostatic precipitator and the cascade evaporator.

The 125-ft. high recovery unit is designed to process 1,650,000 lb. of black liquor solids per day, which corresponds to a flow of 218,000 gal. of black liquor per day. An economizer, tubular gas heater and the Venturi

(Continued on page 390)

Adhesives in the paper industry

Part VI — Synthetic resin adhesives — aldehyde-based resins

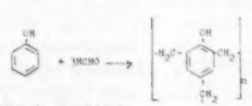
RESINOUS ADHESIVES are certainly not newcomers to the adhesives industry since many of the natural products already discussed fall into this category. Both animal and vegetable proteins are, of course, polymeric or resinous substances. The cellulose adhesives discussed above are polymeric since cellulose is a naturally occurring polymer. In this same category are gums, starches and dextrins. Natural rubber is certainly polymeric, as are some of the natural resins used in adhesives.

With the advent of synthetic polymers, the adhesives manufacturer found at his disposal a vast array of raw materials which allowed him to do things hitherto unthought of. Because of synthetic polymers, the field of structural adhesives has come into its own. And, we now have adhesives which bond metal to metal and eliminate the need for metal fasteners, screws, rivets and even soldering. Actually, the side seams of certain "tin" cans contain a resinous adhesive material in place of the conventional tin solder. These new raw materials have also expanded the vistas of the packaging industry, as evidenced by the large usage which resins such as polyvinyl acetate and polyvinyl alcohol find for paper applications. In discussing these various polymers which provide the basis for a wide variety of new adhesives, we shall follow the outline indicated in Table III (see Part III).

Aldehyde-based resins

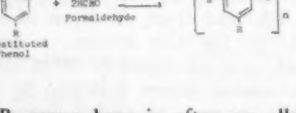
Phenolic resins

From the volume point of view, the phenol-formaldehyde resins are the most important of the aldehyde-based condensates. These result when phenols or substituted phenols are condensed with formaldehyde and are familiar to most people as the "Bakelite" resins, which have been used for many years for many familiar objects such as telephones and electrical parts. The chemistry of the phenol-formaldehyde condensates is quite complex. If phenol itself is condensed with formaldehyde, a resinous material results with the recurring unit indicated in the following equation.



Such resins are tridimensional and gel if the polymerization proceeds far enough. These resins are usually carried to a so-called "B" stage where they are still low enough in molecular weight to be thermoplastic. The use of additional heat, once the resin has been applied as an adhesive or a coating, or has been molded into a desired shape, converts the "B" stage resin to a hard, thermoset product.

If a para substituted phenol is used, the recurring polymer unit can be represented by the following equation.



The R group here is often an alkyl group, such as a tertiary butyl radical. Resins of this type are used largely by the varnish industry.

Phenolic adhesives are used widely by the plywood industry where they provide very strong bonds and a high degree of water-proofness. The phenolics can be combined with animal glues and subjected to a variety of other modifications.

Accordingly, they are compatible with a number of special additives, such as china-wood oil, linseed oil, rubber and rubber derivatives to increase elasticity, impact resistance and drying rates of the adhesive.

In addition to phenol and the para-substituted phenol, indicated in the above equations, a wide variety of other phenolic compounds may be used. These include the cresols, resorcinol and the xylenols. Resorcinol is 1.3-dihydroxybenzene, whereas xylenol is a dimethyl hydroxybenzene.

In addition to formaldehyde, other aldehyde-containing substances may be used. Of these, furfuraldehyde is the most important.

In addition to use in the plywood industry, the phenol-formaldehyde condensates find use as metal-to-metal adhesives, metal-to-wood adhesives, impregnants for paper and cloth and laminating agents for many types of cellulosic layers.

To achieve satisfactory bonding, both heat and pressure must be applied. When bonding paper, films and foils, pressure is applied for only a few seconds since the relatively low strength of the adherends limits the magnitude of the permissible bonding pressures.

With easily compressible materials, such as paper, the surfaces should be joined with sufficient force to squeeze the glue line, but avoiding any deformation of the adherends. Too high a pressure may also result in thin spots or gaps with porous adherends that have irregular surfaces.

A few trial runs should help in establishing the optimum pressures needed for bonding porous or deformable surfaces.

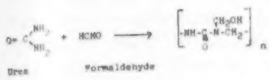
While many of the phenolic-formaldehyde adhesives require organic solvents to bring them into solution, there are a number of excellent water-soluble phenolic adhesives on the market and in general use today. They are economical to use, safe to handle under all conditions, and can be adapted for cold bonding at 70° F by the incorporation of catalysts.

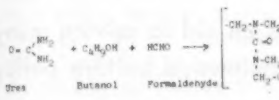
The water-solube phenolics appear as red liquids and contain up to 68 to 72-per cent solids. They have a useful life of several months, if storage tem-

peratures are controlled properly. Flour is often used as an extender in conjunction with these glues.

Urea-formaldehyde resins

The urea resins result when urea is condensed either with formaldehyde or with a combination of butyl alcohol and formaldehyde. The recurring polymer units which result are shown in the following equation:





Phenolic resins excel in exterior durability and are therefore widely used in exterior applications. For best results, they should be heat cured, as they are not as readily cured at low temperatures as the urea resins.

Like the phenolics, these are thermosetting plastics and are valuable in the molding industry because of their light color. They are also used for high-grade finishes in the protective-coatings industry in combination with other resins.

Urea resins adhesives are versatile in application. They can be hot or cold cured but have relatively poor outdoor durability. Contact urea glues are available requiring little or no pressure in bonding.

The moisture-resistance of urea-formaldehyde resins is less than that of phenol-formaldehyde resins. Even so, they find wide application in the adhesives industry.

Like the phenolic adhesive, the urea-based compositions find application in the plywood industry. The urea resins have found use in aircraft construction in some countries for the fabrication of joints between two pieces of wood. In addition to the aircraft industry, the urea adhesives are used in boat building and ski manufacture.

An application of the urea resins in the paper industry is in the manufacture of corrugated fiber board. The incorporation of a urea resin into the starch adhesive, normally used, provides a product which is much more resistant to water.

Urea-formaldehyde resins-starch modifications meet the requirements of industry-wide demands for adhesives. They can be applied at high machine speeds, they have good paste stability and show minimum losses of rejects. The three main uses of urea-formaldehyde-starch adhesives are in corrugating-board production, solid-fiberboard production and bag-pastes formulations.

The urea, as well as the melamine resins which are discussed below, are used as beater and headbox additives in paper manufacture in order to impart wet strength to the paper.

In adhesive formulation, the urea resins are modified, in addition to starch, with other adhesive materials, such as various proteins and animal glues, and resins such as the phenolics. Urea resins can be extended with cereal flour up to twice their weight and still retain a fair degree of moisture resistance.

Urea-formaldehyde-starch adhesives in corrugating-board manufacture

Urea-formaldehyde-starch adhesives may now be used as alkaline or acid pastes, each having its advantages. Both provide good bond strength and can be used at high operating speeds.

An acid-starch paste has a tendency of becoming thixotropic. It must therefore be continuously circulated through the adhesive pans to maintain a constant viscosity. The addition of some chemicals will also help to control viscosity of the paste. Thus, the addition of a small quantity of Tamal-N (1.5 lb. predissolved in 20-lb. water, used in a 300-gal. batch of paste) will help to control the viscosity of the paste due to thixotropy and improve its flow properties.

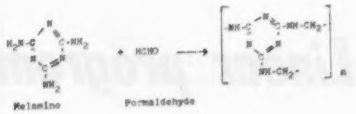
The acid water-resistant urea-formaldehyde-starch paste is incompatible with the alkaline non-water-resistant pastes used in normal production. It is therefore necessary to thoroughly clean mixing equipment, pipe lines and paste pans when changing over to an acid water-resistant adhesive.

The use of urea-formaldehyde in alkaline water-resistant pastes for corrugated-board production is a recent development. The advantage of the alkaline pastes are:

1 **They are compatible with regular non-waterproof starch paste, which eliminates the need for cleaning paste lines and supply tanks when a changeover is made from the regular paste to water-resistant paste.**
2 **Board can be bonded at high speed due to the lower gelatinization temperature required by the alkaline paste.**
3 **The paste is stable in viscosity and is non-thixotropic.**
4 **The alkaline nature of the paste makes it non-corrosive to mixing equipment, pumps, pipe lines, etc.**

Melamine-Formaldehyde Resins

Closely related to the urea resins are the melamine-formaldehyde resins. The basic reaction which leads to a polymer is indicated by the following equation:



Like the urea resins, the melamine resins find use in the protective-coatings industry in combination with other resins. They are useful here because they give extremely good white finishes of the type desired for appliance enamels. The melamine resins have better resistance to water than do the urea resins. They also have better heat stability. However, they are more expensive than the urea resins. Like the ureas, the melamines may be used in plywood manufacture. While their higher cost is a deterrent, the use of melamine fortified ureas which show excellent durability and water resistance is economical and finds many applications in exterior wood doors, boats and skis.

The melamine resins may be combined with starches and dextrins. They may also be combined with urea resins and with phenolic resins. They are useful as impregnants for paper and cloth and they are used as low-pressure laminating resins for a variety of substrates including glass, cloth, paper and textiles.

Other Related Resins

As indicated previously, furfural is an aldehyde which may be substituted for formaldehyde in condensations with phenolic materials. Such resins may be mixed with phenol-formaldehyde resins, or else the phenol may be condensed with a mixture of formaldehyde and furfural. These resins have found a variety of uses as binders, impregnants and adhesives.

Aniline may be condensed with formaldehyde in much the same fashion as phenol to provide a thermosetting resin. These combinations have enjoyed some usage as laminating agents for paper and cloth. They are also good adhesives for abrasives and have good electrical properties. The production of these materials, however, is at a very low level.

A final type of aldehyde resin which may be mentioned results when sulfonamides such as p-toluenesulfonamide is condensed with formaldehyde. A variety of products may be obtained, varying from viscous liquids to hard, brittle solids.

Linear programming and optimal cutting policies

THOMAS C. THEILER

▶ A method of mathematical analysis, as an aid to solving many considerations involved in an optimum pulpwood cutting policy

A PROBLEM not unfamiliar to many woodland managers is that of determining an optimum cutting policy to supply the needs of their pulp and paper mills. The interplay of various considerations such as logging costs, hauling costs, yield factors, availability of pulp, mill characteristics, fixed management policies, and storage capacity, to mention a few, become overwhelming in the number of alternatives they present for investigation. A comparatively recent trend in the analysis of such problems has been to rely on linear programming, a method of mathematical analysis, as an aid in making the most profitable decisions. This article will show how the many considerations involved in an optimum cutting policy can be expressed in mathematical terms, reduced to a matrix form, and solved by either a computer or by a systematic mechanical technique.

General situation

Our hypothetical paper mill will have four woodland areas that can supply us with pulp. Each area will have a pulp content of several species; and for purposes of our analysis, we will consider each cord hauled out of an area to have retained that mix. The assumption here stems from a policy which has been imposed on ourselves by our management which will require us to take whatever wood is available in a given area while the logging equipment is in that area. It could be argued that it may be more desirable to skip over a given species and cut only one or two kinds of pulp within an area. Such an argument must be answered by stating that this paper does not purport to defend its hypothetical management's policies. Rather, it intends only to accept a set of policies and restraints *per se* and develop an optimum cutting policy from them.

Fig. 1 shows the available raw materials and yard storage space for our mill.

Note that three of the four areas in Fig. 1 have a minimum cutting restriction. These minimum restrictions could exist as a result of mature wood that must be cut or be lost in rot or could result from a need to thin out certain areas for better crop control. Here again, the object is to accept the restraints realizing that each different problem will have restraints that are peculiar only to its own particular situation.

The mill yard shown in Fig. 1 has a 160,000-cord capacity. Our problem will be to fill the yard with the proper kinds of wood taken from the four areas that will give us the greatest over-all return in profits.

Table II shows the required cutting by species that must take place in each of the four areas.

TABLE II REQUIRED CUTTING BY CORDS

AREA	POPLAR	HARD WOOD	PINE	TOTAL
A	.....	1,920	480	2,400
B	2,400	4,800	4,800	12,000
C	.....	.....	.....	.....
D	2,000	6,000	2,000	10,000
TOTAL	4,400	12,720	7,280	24,400

It can be seen that 24,400 cords of wood will need to be cut in the proportions shown in the table regardless of where we take the balance of the wood from. It will be necessary, therefore, to consider only the 135,600 remaining cords as part of our problem. We may assume the required cutting is already in the mill yard as we have no alternative but to cut it anyway.

Yield and gain comparisons

The yield for each species of wood is shown in Table III and is expressed in terms of dollars per cord.

TABLE III RELATIVE YIELD COMPARISONS

	POPLAR	HARD-WOOD	PINE
Price of paper/ton	$148.00	$148.00	$148.00
Less Differential Process Cost	38.00	38.00	.....
Differential Gain	$110.00	$110.00	$148.00
Times Yield (tons paper/cord wood)	0.77	1.00	0.59
Relative Yield (dollars/cord)	$ 85.00	$110.00	$ 87.00

As can be seen from Table III, the relative yield, as defined, depends on the difference in processing cost between the soft- and hard-woods as well as on the pulp yield of the species itself. For the sake of balancing the data, let us assume the cost of processing the hardwood and poplar to be $38.00 per ton more than the pine. Obviously, depending on the processes used, the condition of the equipment, and the layout of the mill, almost any differential relationship could exist. It should also be noted that the yield is expressed in relative terms as all of the process costs are not subtracted from the selling price of the finished paper. This, however, will not affect our problem as our cutting policy will depend on the relative yields rather than on absolute profit figures. The same end results could be obtained by making a comprehensive cost study of the processes in the mill under consideration and subtracting the full process costs from each species.

Table IV itemizes the net gain realized from each species of wood

in each area after the logging and hauling costs were deducted from the relative yields. The logging costs vary somewhat with the area in which the wood is logged as well as with each species within the area, while hauling costs vary only with the distance of the haul.

Mill restraints

At this point we are ready to begin expressing our restraints and relationships in a mathematical form. Each species of wood to be taken from a given area as well as the total wood taken from that area is designated by an x with a subscript. Referring again to Fig. 1, we can see that the hardwood in Area A is represented by x_1, the pine by x_2, and the total optional pulp by x_3. Similarly, the other species and totals were designated giving us fourteen variable factors in all.

To express our first relationship we recall that our yard cannot hold more than 160,000 cords, of which 24,000 cords must be cut as shown in Figs. 1 and 2. Expressed mathematically we say:

$$x_3 + x_7 + x_{10} + x_{14} \leq 160{,}000 - 24{,}400$$

or in words: the total wood taken from Area A, plus Area B, plus Area C, plus Area D must be less than or equal to our 160,000 cords of yard capacity minus that wood we have noted must be cut in any event and that we, therefore, have already considered as being in the yard. Our relationship may be further refined to:

$$x_3 + x_7 + x_{10} + x_{14} + y_1 = 135{,}600 \text{ cords} \quad (1)$$

The y_1 introduced at this point is known as a "slack" variable and represents that amount of wood under 135,600 cords that, for one reason or another, may not be brought into the yard; and which is, therefore, necessary to convert our expression into an equation.

Again, because of the characteristic of our mill, suppose that it could handle only a limited amount of pine. And suppose further, that the pine processed may not exceed 30 per cent of the total wood handled. Such could easily be the situation in a mill producing both corrugating medium and kraft liner board. Our next relationship would then be expressed as:

$$7280 + x_2 + x_6 + x_{13} < 0.3\ (x_3 + x_7 + x_{10} + x_{14} + 24{,}400)$$

or again in words: the pine already assumed to be in the yard plus the pine taken from our four areas of access must be less than or equal to 30 per cent of the total wood taken out of the four areas plus the total already assumed to be in the yard. As

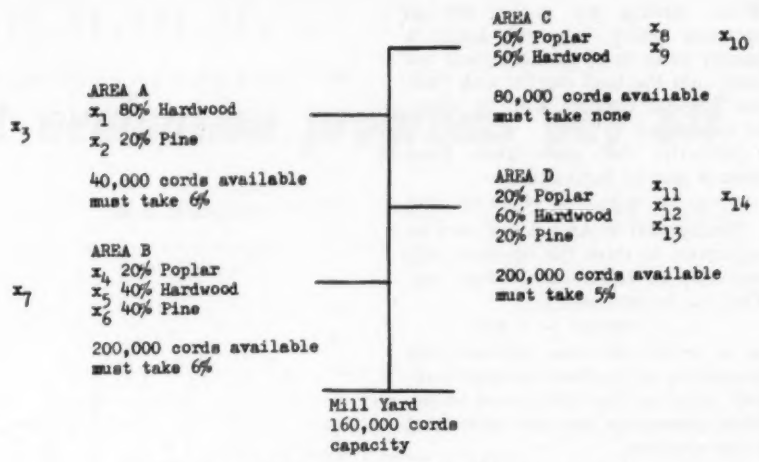


Fig. 1. Available raw materials and yard storage space.

in Equation 1, this relationship can also be reduced to an equation:

$$x_2 - 0.3x_3 + x_6 - 0.3x_7 - 0.3x_{10} + x_{13} - 0.3x_{14} + y_2 = 40 \quad (2)$$

Also, because of our process, suppose we had found that poplar can be mixed with hardwood in making a corrugating medium sheet but only to the extent where the poplar can be no more than 30 per cent of the total poplar and hardwood mix. Considering this restriction, we must develop the following relationship as was done in Equations 1 and 2:

$$4400 + x_4 + x_8 + x_{11} \leq 0.3\ (x_1 + x_4 + x_5 + x_8 + x_9 + x_{11} + x_{12} + 4400 + 12{,}720)$$

which can be reduced to:

$$-0.3x_1 + 0.7x_4 - 0.3x_5 + 0.7x_8 - 0.3x_9 + 0.7x_{11} - 0.3x_{12} + y_3 = 736 \quad (3)$$

We have now developed the three major restraints placed on the wood that is to come into our yard; namely: (1) the total wood must not exceed 160,000 cords; (2) the pine must not exceed 30 per cent of the total wood; and (3) the poplar must not exceed 30 per cent of the total poplar and hardwood mix.

At this point it becomes necessary to look at our four areas once again to develop the expressions for each area which will control the cutting within those areas.

Cutting restraints

In Area A we see that the hardwood cut must be equal to 80 per cent of the total pulp taken from that area. This expression can be written in direct equation form:

$$x_1 = 0.8x_3$$

However, because of the nature of the model which we are building, it becomes necessary to include a slack variable in each of the equations developed. Therefore, our equation must be rewritten as:

$$x_1 - 0.8x_3 + y_4 = 0 \quad (4)$$

TABLE IV COMPUTATION OF NET GAIN PER CORD

	POPLAR	HARDWOOD	PINE
AREA A			
Relative yield (dollars/cord)		$110.00	$87.00
Less cost of logging/cord		6.50	6.00
Less cost of hauling/cord		6.50	6.50
Net gain/cord		$ 97.00	$74.50
AREA B			
Relative yield (dollars/cord)	$83.00	$110.00	$87.00
Less cost of logging/cord	6.00	6.50	6.00
Less cost of hauling/cord	5.00	5.00	5.00
Net gain/cord	$74.00	$ 98.50	$76.00
AREA C			
Relative yield (dollars/cord)	$84.00	$110.00	
Less cost of logging/cord	6.50	6.50	
Less cost of hauling/cord	7.00	7.00	
Net gain/cord	$71.50	$ 96.50	
AREA D			
Relative yield (dollars/cord)	$85.00	$110.00	$87.00
Less cost of logging/cord	5.50	5.50	4.50
Less cost of hauling/cord	6.00	6.00	6.00
Net gain/cord	$73.50	$ 98.50	$76.50

When solving our system for an optimum policy, we will assign a penalty value to y_4 so that it will not enter into the final results; and, thus, our original equality will, in effect, be maintained.

Similarly, the pine taken from Area A may be expressed as:

$$x_2 - 0.2x_0 + y_5 = 0 \quad (5)$$

Finally, still in Area A, we need an expression to show the optional pulp that may be taken out of that area. This may be expressed as:

$$x_3 \leq 40{,}000 - 2{,}400$$

or in words: the total optional pulp is equal to or less than the total available pulp, less that which must be cut. This relationship can then be reduced to the equation:

$$x_3 + y_6 = 37{,}600 \quad (6)$$

Following the same procedure for the remaining three areas gives the following additional equations:

AREA B

$$x_4 - 0.2x_7 + y_7 = 0 \quad (7)$$
$$x_7 + y_{10} = 188{,}000 \quad (10)$$
$$x_5 - 0.4x_7 + y_8 = 0 \quad (8)$$
$$x_6 - 0.4x_7 + y_9 = 0 \quad (9)$$

AREA C

$$x_8 - 0.5x_{10} + y_{11} = 0 \quad (11)$$
$$x_9 - 0.5x_{10} + y_{12} = 0 \quad (12)$$
$$x_{10} + y_{13} = 80{,}000 \quad (13)$$

AREA D

$$x_{11} - 0.2x_{14} + y_{14} = 0 \quad (14)$$
$$x_{12} - 0.6x_{14} + y_{15} = 0 \quad (15)$$
$$x_{13} - 0.2x_{14} + y_{16} = 0 \quad (16)$$
$$x_{14} + y_{17} = 190{,}000 \quad (17)$$

Functional relationship

So far, we have developed a series of 17 simultaneous equations which represent the restraints or limitations within which our cutting policy must fall. Our next step will be to set up one final relationship or functional which will contain all of the variables which we have noted and which will be used as a guide to maximize our return or net gain. This is done by considering each variable in our system of equations and assigning a coefficient to it such that our computer can determine the relative differences in net gain between the variables and thus optimize or bring the "best" variables into the final solution.

Considering our x variables first, we recall that x_1 will give a net gain of $97.00 for each cord of it taken from Area A. (See Table IV). Similarly, x_2 will return $74.50 so the coefficients for x_1 and x_2 will be $97.00 and $74.50 respectively. Our x_3 (See Fig. 1) is a control variable used to hold x_1 and x_2 to a fixed percentage of the total pulp taken from Area A. Consequently, any return realized by taking a cord of wood from Area A has already been expressed in x_1 and x_2, so x_3 must assume a coefficient of 0. In like manner, the other x variables are analyzed to give an expression for all the x variables that looks like:

$$97x_1 + 74.5x_2 + 0x_3 + 74x_4 + 98.5x_5 + 76x_6 + 0x_7 + 71.5x_8 + 96.5x_9 + 0x_{10} + 73.5x_{11} + 98.5x_{12} + 76.5x_{13} + 0x_{14} = \text{x values to be maximized.}$$

Next, our y variables must be considered. Recall that y_1, y_2, and y_3 were slack variables that were necessary to reduce our first three expressions into equations. Any value that these y variables take on would only tend to prevent a higher return on the over-all system of equations because they represent wood not brought into the yard. For example, in Equation 1, if y_1 took on some value, this would mean that the total wood brought into our yard would be less than, rather than equal to the 160,000 cords which we have room for. Disregarding any opportunity costs, therefore, y_1 could only take on a value of zero—i.e. we get zero return for the wood that we do not bring into the yard. So y_1, y_2, and y_3 have coefficients of zero.

In developing Equation 4 we stated that we would assign some high penalty cost to y_4 to insure that it would not be brought into our solution and, thus, be able to use a slack variable necessary for computational purposes and yet, maintain the original equality which we set down. Consequently, we arbitrarily assign a penalty cost of −$500 to y_4 which says that each unit of y_4 brought into our system will reduce the total return by $500. In like manner the other y variables are analyzed giving us a total functional expression of:

$$0y_1 + 0y_2 + 0y_3 - 500y_4 - 500y_5 + 0y_6 - 500y_7 - 500y_8 - 500y_9 + 0y_{10} - 500y_{11} - 500y_{12} + 0y_{13} - 500y_{14} - 500y_{15} - 500y_{16} + 0y_{17} + 97.0x_1 + 74.5x_2 + 0x_3 + 74.0x_4 + 98.5x_5 + 76.0x_6 + 0x_7 + 71.5x_8 + 96.5x_9 + 0x_{10} + 73.5x_{11} + 98.5x_{12} + 76.5x_{13} + 0x_{14} = \text{total functional to be maximized.}$$

Matrix set-up

Now it becomes necessary to itemize our equations in the form of a matrix. The matrix is merely an orderly listing of the coefficients of our 17 equations with the x_0 column representing the right side of our equations and the top row representing the functional which we have just developed. The resulting matrix is pictured in Fig. 2.

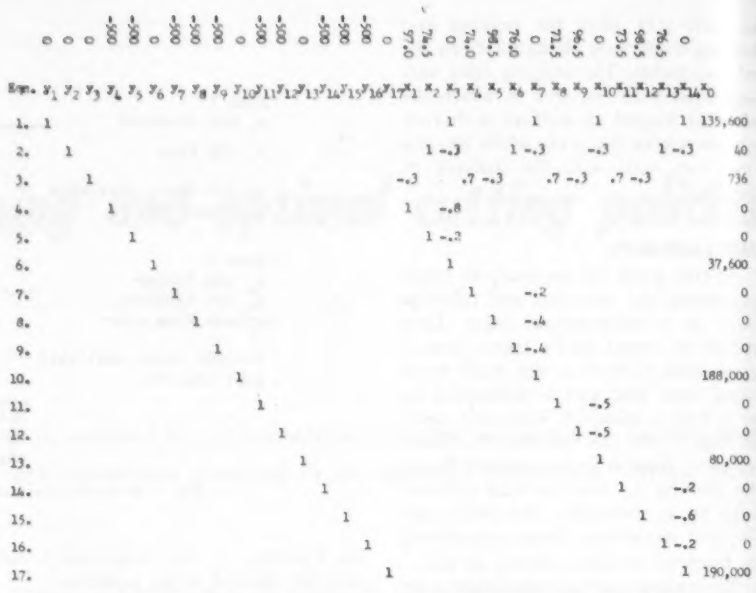


Fig. 2. Matrix—showing an orderly listing of coefficients of 17 equations.

Solution and interpretation

Our matrix may be solved at this point either by using an orderly but somewhat time consuming mechanical procedure described in most books on linear programming* or by placing our matrix on an electronic computer. In our case the matrix was placed on a computer which returned the following results:

(Continued on page 391)

*Vazsonyi, Andrew; *Scientific Programming in Business And Industry;* Chapter 4.

Cooperative felt evaluation programs pay off

W. S. Wightman

Assistant Chief Designer
Albany Felt Co.

AN INCREASING number of mill managers and superintendents in paper mills are becoming aware of the effect improved felt performance can have on over-all mill efficiency. Furthermore, many superintendents realize that it is only by close cooperation between the paper mill and the felt manufacturer that a realistic evaluation of felt efficiency can be made, so that design changes can be incorporated for improved felt operation. Very often, these felt evaluation programs may take many months; sometimes even a year may be spent before final results from the modified felt design are considered satisfactory. It is obvious, however, that any project of this nature must be a cooperative effort because, in addition to design changes, machine modifications are quite often necessary.

A good example of the remarkable progress which can be accomplished by a mutual program of this type occurred recently at a large, modern kraft mill in the South.

The problem

In this mill, they were encountering trouble with first press felts on the No. 1 Machine, a three-press fourdrinier making various grades of unbleached kraft. For months the first press felts had been removed before they were worn out due to excessive filling. In addition, the superintendent was bothered by shadow marking and he was convinced that through modifications in felt design, as well as in the machine itself, felt life and performance could be improved on this position. In other words, he really had three objectives in mind in instituting a felt evaluation program:

(1) To develop a felt that would operate cleaner and more open longer.
(2) Eliminate shadow marking.
(3) Improve felt life.

Accordingly, he called in an Albany Felt service engineer for a complete survey of his machine. They reviewed these problems from every angle.

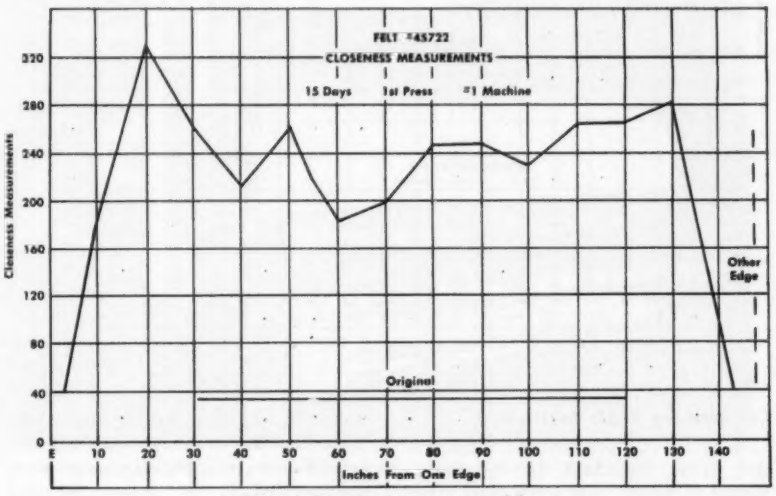


Chart 1. Porosity tests on press felts.

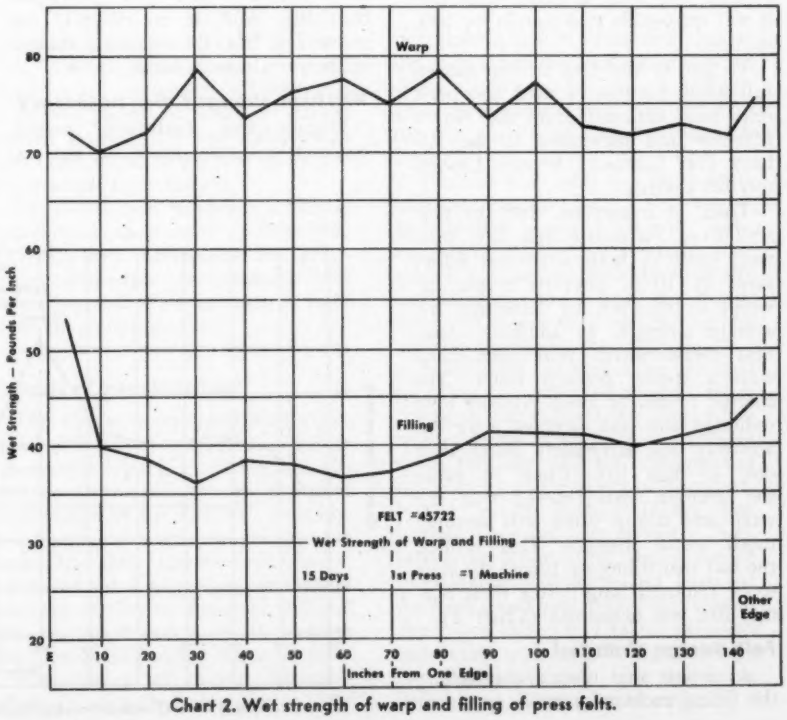


Chart 2. Wet strength of warp and filling of press felts.

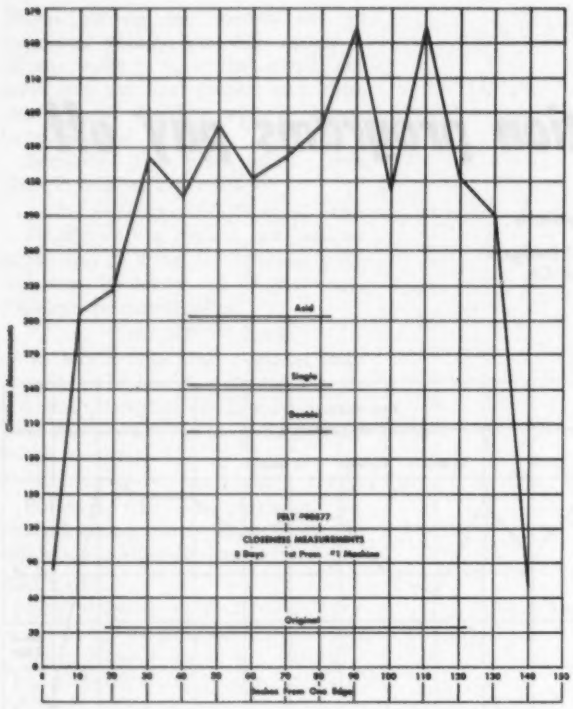


Chart 3 — Closeness measurement on press felts.

Laboratory tests instituted

A review of felt records indicated that felts, regardless of the make, started to fill up only a few days after they had been installed on the machine. Usually, after an average run of 15 days, they had to be removed because they were so badly filled that it was impossible to maintain top production.

To get to the root of the matter, full width samples of used first press felts were obtained from the No. 1 Machine and forwarded to the Albany Felt Customer Service Laboratory for analysis.

Then, in connection with the possibility of increasing felt life, tests were made of both warp and filling yarns at 10-in. intervals across the width of the felt to determine the average strength. In addition, closeness measurements were also made with a special porosity tester. The charted results of these porosity tests indicated that the samples were extensively and irregularly filled after only 15 days' life (Chart 1) while the strength tests showed that the warp and filling yarns still retained much useful strength. This verified the fact that filling up forced the felts to be removed long before their normal life was exhausted (Chart 2)

Felt design changed

As a first step toward overcoming the filling problem, a more open first press felt was designed for No. 1 Machine in order to provide better drainage. To do this, bulkier yarns were incorporated in its construction and it was made in a more open weave. Also, the Albany J-3 chemical treatment was applied to these felts to keep them soft and open throughout their life. And, in an effort to improve felt life, the synthetic content of the yarns was increased.

Machine changes also necessary

During this evaluation period, modifications were made on the machine which also contributed towards improved felt operation. First, it was recognized that the premature filling of the first press felts required changes in the operation of the felt conditioners on the first and second press felts. Both conditioners were operated from one vacuum pump and as the felts became filled, the vacuum took the path of least resistance. Consequently, when the first press felts started to become filled, the vacuum "worked" on the second press felt conditioner more than on the first press felt unit. Therefore, a butterfly valve was added to the vacuum line to remedy this situation. However, even this proved inadequate, so, later, the felt conditioners were connected to individual pumps.

In addition to this important machine change, new covers were put on the felt conditioner shoes which increased their efficiency and reduced felt wear, and the felt conditioner drives were changed to improve their operation. Also, the temperature of the water in the felt conditioner shoes was raised to 130°F. to reduce the viscosity of the water and improve the drainage. The water pressure in the felt conditioners was also increased to 25 psi, and the vacuum in both shoes was increased to 10 in.

Washing recommendations

Not content with these design and machine changes, the Albany Felt service engineer investigated the washing procedures that were being used on these first press felts, since an occasional felt would fill up badly after only eight days' life, indicating the need for better washing methods. Additional samples were obtained and washing tests were made in the Al-

(Continued on page 391)

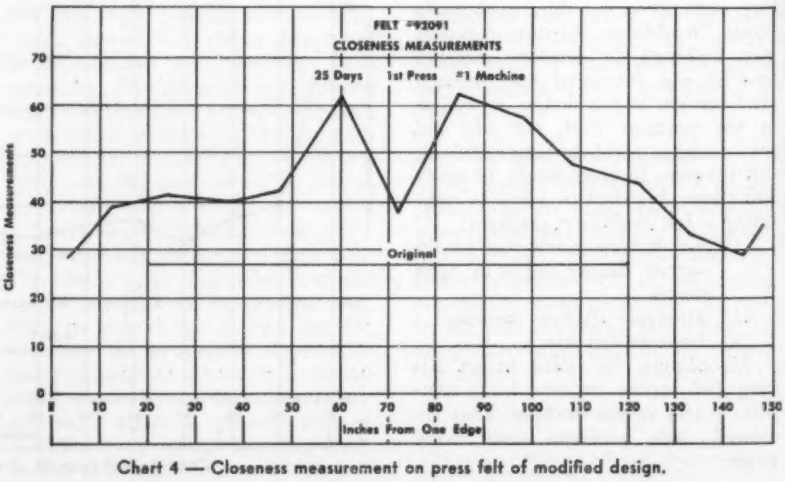
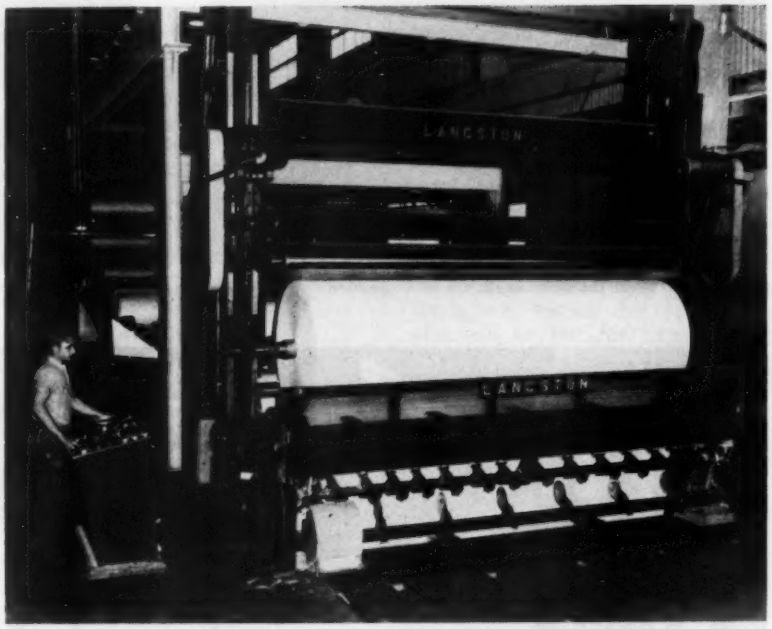


Chart 4 — Closeness measurement on press felt of modified design.

Paper machine winder reduces finishing operation

J. W. DRAGONETTI



Langston 144-in. paper machine winder in operation at St. Regis' mill.

A PAPER MACHINE winder turns out tightly wound, shipping quality rolls of desired widths and diameters, thereby reducing a finishing room operation, at St. Regis Paper Co., Pensacola, Fla., according to a case history released by the Samuel M. Langston Co., Camden, N.J.

Before the new winder was installed on the No. 1 fourdrinier at the St. Regis plant, it was the practice to wind off (on stock intended for conversion) to counter rolls into jumbos, to be slit and rewound to specifications in the finishing room.

Now a wide variety of paper and board grades is slit and rewound on a heavy-duty, 144-in. wide, 72-in. dia. rewind slitter and winder, built and installed by Langston.

In converting orders at the paper machine, the winder is handling paper and board grades ranging from 40 to 300 lb. (24 by 36-500 basis). The equipment slits and rewinds rolls up to 60 in. in dia. and down to as narrow as 2¾-in. rolls of 48 in. in dia.

The pushbutton control features of this machine, including rider roll control, rewind shaft control, rewind shaft loader, contribute sufficient versatility to permit St. Regis to have a limited counter roll operation which now takes about 30 per cent of the paper machine's production.

The 3000 fpm winder is currently operating at about 2600 to 2700 fpm. Its heavy-duty construction and precision manufacture are credited with producing a finished product of tight clean cut shipping rolls.

Details of construction

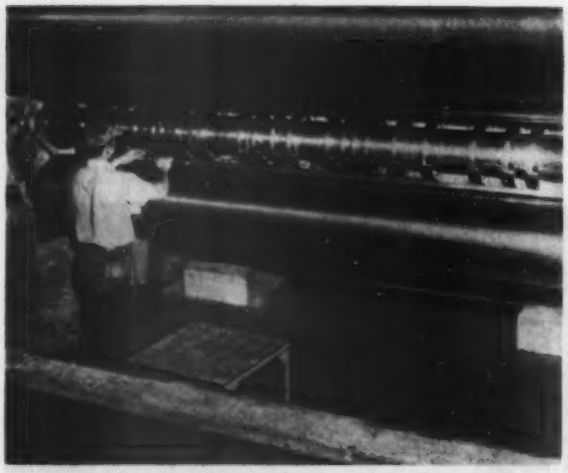
The winder is equipped with a patented roll density controller. This automatically regulates, throughout the buildup on the roll, the effective pressure exerted by the rider roll assembly. It provides uniform nip pressure between the sheet and the extra-heavy, 18-in. rewind drums — in conjunction with the driving of the rider roll and the rewind drums — thus assuring uniform density in the rewound rolls.

Contributing to overall operation efficiency are such features as (1) the hydraulic actuation of raising, lowering and automatic loading of rewind shafts ranging in dia. from 3 to 8 in.; (2) the hydraulic roll ejector; (3) the nip guard and (4) the roll drop table.

The roll drop table is a heavy-duty, mill-type machine with a scissor-type, hydraulically powered lift with pushbutton controls from the winder console. It is equipped with automatically controlled roll stops. Arms that bridge between the roll drop and the winder are also pushbutton controlled.

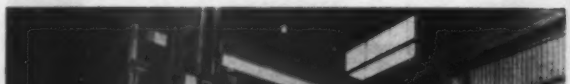
In addition, air brakes are provided to bring the idler rolls and carrier drums to an immediate stop when winder power is shut off — enabling quick threadup and roll changes and contributing to the safety of operation.

The winder machine frames, box section in design, are of heavy duty, cast construction. Roll shafts are of centrifugally cast steel and balanced for high speed operation. Main winder drum bearings are Timken precision heavy-duty type and all other bearings are SKF heavy-duty. The winder is driven by a Westinghouse motor.



Shear cut slitter heads are set in position.

Hydraulically operated shaft loader push button controlled.



Rewound roll is ejected to roll drop table.

Winder produces shipping rolls with clean separation.

Buckeye Cellulose

(Continued from page 381)

scrubber evaporators balance the heat release to provide the high thermal efficiency as evidenced by the 200°F flue gas temperature to the stack. The unit is served by a two-stage tandem induced draft fan system, with both rotors made of stainless steel and the housing of ⅜-in. corton plate.

The draft fan is an 835-rpm compound type driven by a 2700-hp, 5000-rpm, back pressure type steam turbine.

Because of the large size of the recovery unit, it was necessary to divide the scrubber-cycle evaporators into two units. All areas that come in contact with wet liquor are of 304 stainless steel construction and stainless steel is also specified for all black liquor pumps and piping. The economizer and vertical gas air heater associated with the recovery unit are provided with a shot cleaning system.

Black liquor from the evaporators enters the Venturi cyclone-evaporator at 50 per cent solids and is evaporated to 65 per cent solids content.

A unique design of the scrubber section is the spraying of both 65 per cent and 50 per cent black liquor into the twin scrubber sections through separate headers, which accounts for the unusually high rate of chemical recovery.

The recovery unit is base-loaded by manual control of black liquor flow. Total air for black liquor burning is automatically controlled. Other control systems on the recovery unit include: (1) total air-primary air ratio control, (2) three-element feed water control, (3) furnace draft control, and (4) an oxygen and combustibles recorder.

In the recausticizing operation lime is burnt in an oil-fired kiln equipped with variable speed induced draft fan and an oxygen analyzer to maintain proper combustion.

Recaustizing equipment further includes in addition to various steel tanks (see list of equipment): (1) a No. 10 lime slaker, caustic type, of stainless steel construction including tank; (2) three No. 15 causticizers, caustic type, with drives; (3) a type A3TB white liquor clarifier mechanism with motorized lifting device for a 40-ft.-dia. by 24-ft.-deep tank; (4) a 35-ft.-dia. by 24 ft.-deep type ATBHB lime mud washer mechanism with motorized lifting device;

(Continued on page 438)

Felt evaluation

(Continued from page 388)

bany Felt Customer Service Laboratory. The average closeness of a worn first press felt sample ranged around 442* as compared to an original measurement of 34* for the felt when new. To determine the very best possible washing solution for this particular position, samples were washed in several different agents. Results of these tests were as follows (see also Chart 3):

First Press Felt — No. 1 Machine
Average Closeness Measurements*

As received from mill after 8 days' operation		442
1. Acid Wash	— 10% Muriatic Acid; rinse	305
2. Single Wash	— Soda ash, synthetic detergent, rinse	245
3. Double Wash	— Acid wash followed by soda ash, synthetic detergent, rinse	201
When new		34

*Closeness in this case is an inverse porosity measurement, in which a higher figure represents a closer felt.

Obviously, the results of these tests indicated that the most effective method was the double solution procedure —No. 3. This system was adopted by the mill thereafter and with great success. However, it should be emphasized that for any washing procedure to be effective, the washing should begin early in the life of the felt before it has had a chance to fill up.

Shadow marking problem eliminated

Through all these improvements, the Albany Felt Design Department and the paper mill superintendent focused their attention on eliminating the faint shadow marking on this first press position. After further experimentation and modification of felt design, a heavier, bulkier felt was made and a special chemical treatment added to provide increased water removal. The new design gave the suction press enough cushion so that, finally, the shadow marking almost completely disappeared.

Final results

As a result of these combined changes, felt life was increased from 15 to 25 days. Furthermore, the felts stayed more open and cleaner throughout their life on the machine as illustrated by comparing Chart 1 (previous design) and Chart 4 (modified design)

Although this entire program took over a year to complete, the excellent results more than justified the time and energy expended, for they obtained an average increase in felt life of 65 per cent, a substantial increase in daily production and the persistent shadow marking problem was greatly reduced.

Furthermore, it should be noted that the program required a minimum investment in facilities. We believe this illustrates that one of the most effective and economical methods for papermakers to achieve improved felt performance and higher daily production is by working closely with your felt supplier's "team" on this type of cooperative felt evaluation program.

Linear programming

(Continued from page 386)

TABLE V COMPUTER RESULTS

	VALUE	EVALUATOR		VALUE	EVALUATOR
y_1		89.10	x_1	30,080	
y_2	13,600		x_2	7,520	
y_3	13,680		x_3	37,600	
y_4		597.00	x_4	0	
y_5		574.50	x_5	0	
y_6		3.40	x_6	0	
y_7		574.00	x_7		4.50
y_8		598.50	x_8	0	
y_9		576.00	x_9	0	
y_{10}	188,000		x_{10}		5.10
y_{11}		571.50	x_{11}	19,600	
y_{12}		596.50	x_{12}	58,800	
y_{13}	80,000		x_{13}	19,600	
y_{14}		573.50	x_{14}	98,000	
y_{15}		598.50			
y_{16}		576.50			
y_{17}	92,000				

As it is shown, the computer returned two columns of results which are labeled "Value" and "Evaluator". The value column represents the values that the respective variables must assume for an optimum solution. It shows that 13,600 cords of pine (y_2) and 13,680 cords of poplar (y_3) of the total permissable pine and poplar were replaced in the yard by hardwood. It further shows that all of the optional pulp was left in Area B and Area C and that 92,000 cords were left in Area D.

Extracting the x values from our results and adding them to the required cutting shown in Table II gives the following:

TABLE VI OPTIMUM CUTTING POLICY

	POPLAR	HARDWOOD	PINE	TOTAL
Area A	.....	32,000	8,000	40,000
Area B	2,400	4,800	4,800	12,000
Area C	.....	.....	.....	.....
Area D	21,600	64,800	21,600	108,000
TOTAL	24,000	101,600	34,400	160,000
Percentage	15%	63.5%	21.5%	100%

Note from Table VI that the pine will amount to only 21.5 per cent of the total wood, 30 per cent was our maximum figure, and that the poplar will amount to approximately 15 per cent. The poplar amounts to 19 per cent of the poplar and harwood mix which is also within our 30 per cent maximum figure. Note, too, that the solution automatically determines the percentage of the different kinds of woods to be used in the mills for a maximum profit return.

The evaluator figures are penalty costs associated with a deviation from our optimum policy. You will recall that we placed a penalty value of $500 on some of our slack variables to keep them out of our solution, which we successfully did, and we will not be concerned with those values any further. They are y_4, y_5, y_7, y_8, y_{11}, y_{12}, y_{14}, y_{15}, and y_{16}.

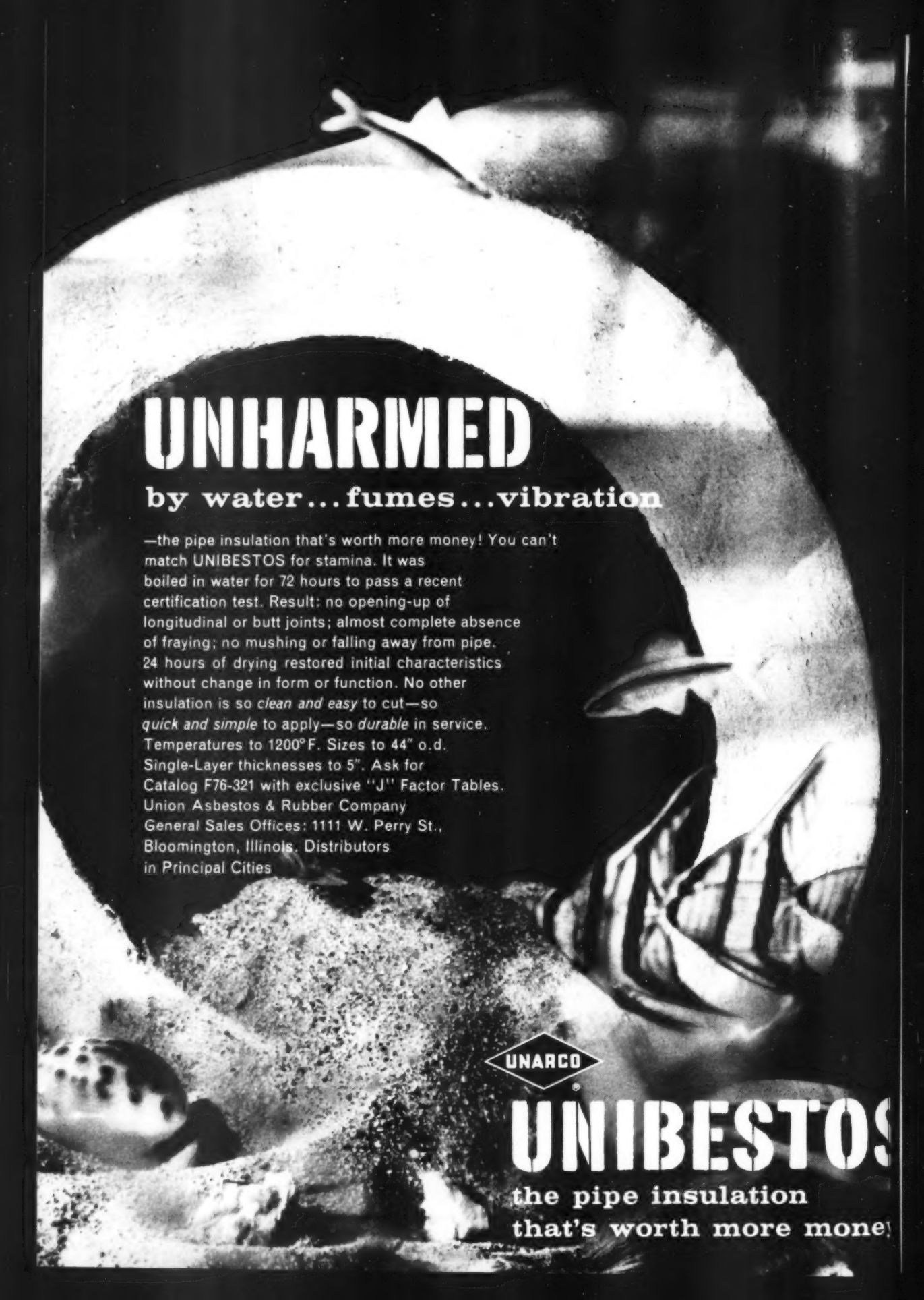
The penalties associated with our other variables may be interpreted as the amount that the return on our optimum solution will be reduced for each unit of that variable brought into the solution. Considering y_1, for example, we can see that $89.10 net gain will be lost for each cord of wood not brought into the yard. Likewise, the y_6 evaluator tells us that each cord of wood taken from Area D rather than Area A will cost us $3.40 in the form of net gain lost. Similarly, the x_7 and x_{10} evaluators show us that $4.50 and $5.10 in net gain would be lost for each cord of wood we took from Areas B and C, that was not required cutting, in place of that taken from Area D.

The computer also tells us that the total net gain from this policy is $12,209,800. Subtracting the basic process costs from this figure will give an expected profit for our wood inventory.

Conclusion

From this paper it can be seen that linear programming is not the great mystery it is sometimes thought to be. Rather, it is an orderly reduction of managerial constraints and policies into mathematical expressions which can in turn be optimized to reveal a "best" answer. As was mentioned in the text, the paper does not propose to build a model that will fit any woodlands problem, rather to have shown how it is possible to use the conditions that are given in any situation and build a model peculiar to that situation. Models covering long range as well as short range cutting policies may be built.

In closing, this is only one area in the pulp and paper industry where linear programming may be used. Others would include scheduling, shipping, and converting. Modern management would do well to investigate this technique as an aid to planning; for even a small percentage of savings in a multi-million dollar annual volume will often reward the effort of investigating this tool many times over.


UNHARMED
by water...fumes...vibration
—the pipe insulation that's worth more money! You can't match UNIBESTOS for stamina. It was boiled in water for 72 hours to pass a recent certification test. Result: no opening-up of longitudinal or butt joints; almost complete absence of fraying; no mushing or falling away from pipe. 24 hours of drying restored initial characteristics without change in form or function. No other insulation is so *clean and easy* to cut—so *quick and simple* to apply—so *durable* in service. Temperatures to 1200°F. Sizes to 44" o.d. Single-Layer thicknesses to 5". Ask for Catalog F76-321 with exclusive "J" Factor Tables. Union Asbestos & Rubber Company General Sales Offices: 1111 W. Perry St., Bloomington, Illinois. Distributors in Principal Cities
UNARCO
UNIBESTOS
the pipe insulation that's worth more money

User Report—

"Last Longer without Maintenance!"

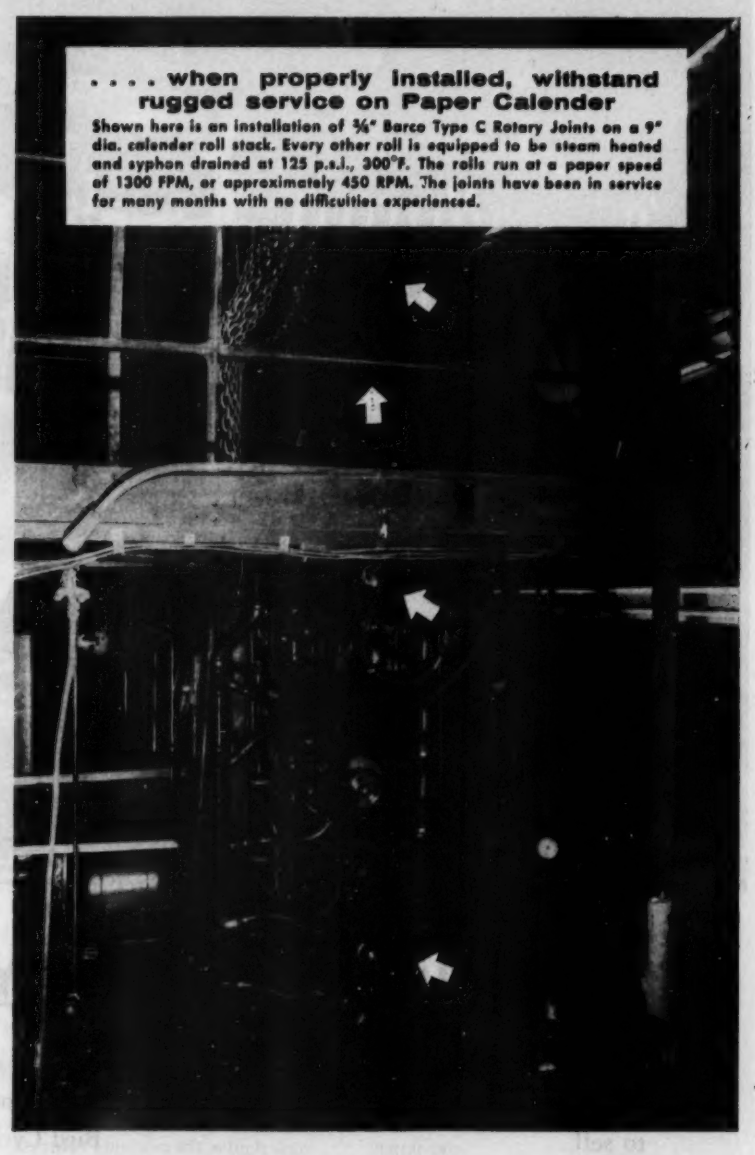
BARCO
TYPE C
Rotary Joints
PROVE BEST!

Here is another case where an experienced user of rotary joints made comparative tests. Two other makes of joints were tried and Barco selected. The Barco Type C gives you everything you want in a modern rotary joint:

MULTI-USE—One basic style for all services, single flow or syphon flow. One basic seal for steam, water, hot oil, air, gas, or chemicals, including alternating hot and cold service.

NO LUBRICATION NEEDED—The spherical seating seal, which is under compression, is self-adjusting for wear and readily replaceable when required. A distinctive external signal makes it possible to determine, in advance, when maintenance and seal replacement is advisable.

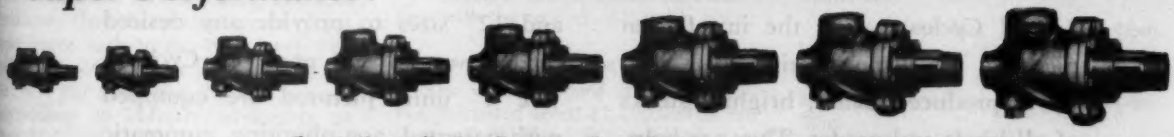
BARCO SERVICE—Type C Joints are available from LOCAL STOCKS throughout the country. Barco sales engineers serve all areas. Standard series joints handle all steam pressures to 200 p.s.i.; hydraulic pressures to 400 p.s.i.; temperatures to 500°F, special to 650°F. Other styles can be supplied for higher pressures, if required. Rotary syphon types and high speed types are also available.



. . . . when properly installed, withstand rugged service on Paper Calender

Shown here is an installation of ¾" Barco Type C Rotary Joints on a 9" dia. calender roll stack. Every other roll is equipped to be steam heated and syphon drained at 125 p.s.i., 300°F. The rolls run at a paper speed of 1300 FPM, or approximately 450 RPM. The joints have been in service for many months with no difficulties experienced.

Super Performance!



For countless applications, Barco's new Type C Rotary Joint will give you the best operating records you've ever had—*and for LESS COST!* Special treatment on the rotating sleeve minimizes corrosion, friction, and wear. This feature is standard with Barco at no extra cost. Stainless steel spring is also standard.

RESISTS SEAL RING BREAKAGE—The spherical seal ring is under *compression*, not *tension*, loading. Self-adjusting for wear. Seal withstands shock loads and vibration.

WIDE SPACED BEARINGS—*Two*, instead of *one* . . . increased bearing area. Bearings heat shrunk in place under compression for greater strength.

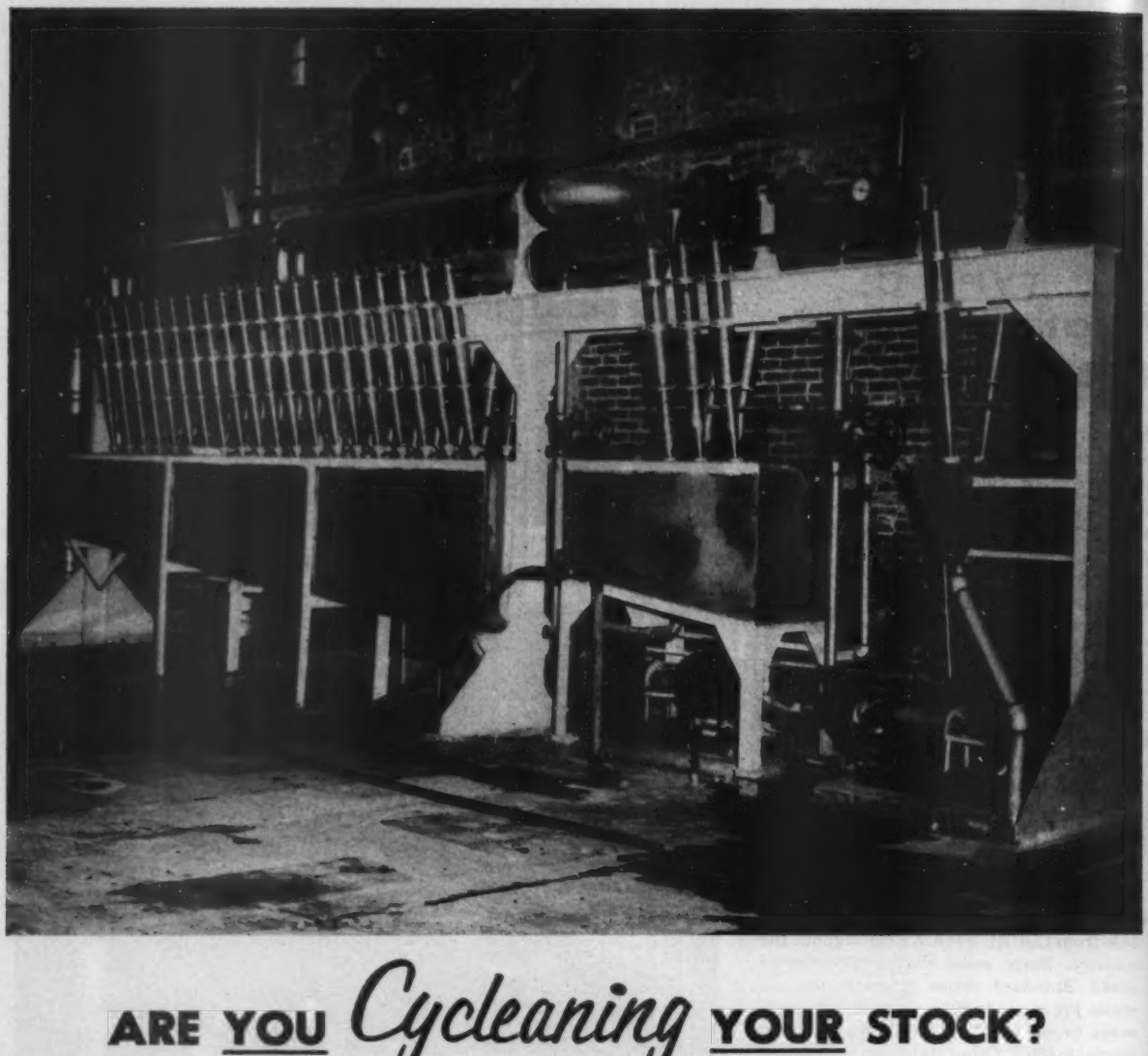
200 P.S.I. STEAM RATING—Super duty service at *no extra cost*. Eight sizes, ½" to 3" with right or left hand threads on rotating sleeve.
Send for new Catalog 310 today.

SEND FOR CATALOG 310.

BARCO MANUFACTURING CO.
526K Hough Street • Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Rotary Joints
In Canada: The Holden Co., Ltd., Montreal

PRODUCTS BACKED BY EXPERIENCE
BARCO
FOUNDED 1908



ARE YOU *Cycleaning* YOUR STOCK?

Cycleaned pulp and paper is easier and less expensive to make — easier to sell.

Bird Cycleans, like the installation pictured, are demonstrating their ability to produce cleaner, brighter stocks of all kinds and grades. They are helping to reduce breaks, reduce washup time, increase wire life, step up production and improve fibre hydration.

Bird Cycleans are available in 4″, 7″ and 12″ sizes to provide any desired capacity up to 850 gpm per Cyclean. The 4″ units pictured are equipped with patented, non-plugging, automatic purge tips.

Ask us for recommendations, layouts and estimates.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.
REGIONAL OFFICES: EVANSTON, ILLINOIS
PORTLAND, OREGON • ATLANTA 9, GEORGIA
Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

BIRD MACHINE'S 50th YEAR OF SERVICE TO INDUSTRY

CURRENT COMMENTS

Paper that breathes . . . Income and sales . . . Uniscan Agreement

WARREN B. BULLOCK

Cigarette paper that breathes is the latest achievement of paper research. Newspapers and the air waves are being flooded with advertisements and commercials proclaiming the virtues of several brands of cigarettes, Canadian as well as American, made with this new paper which, it is claimed, will allow cool air to enter the cigarette and permit the heat to escape.

THIS NEW result of research follows the development of paper that stretches, and the work of synthetic fiber manufacturers to find better uses for wood pulp.

American Viscose Corp., American Anka Corp. and Courtaulds have developed high wet modulus cellulose fibers which resist stretch when wet. When woven into fabrics they can be pre-shrunk to attain a new dimensional stability. As these viscose staples reach commercial maturity they will increase the consumption of chemical cellulose, to the advantage of all companies making high grade wood pulp.

Paper-base clothing for hospital use

Meanwhile, the Army Quartermaster Corps has begun use-testing of disposable paper-base clothing items including surgeons caps, surgical gowns and similar clothing for hospital use, even paper bed linens.

Back to 1956 level

Income and sales reports of the paper companies now becoming available indicate that the percentage of profit has come back to the 1956 level. The rate of profit to sales dropped in 1958 to 4.7 per cent, but the rate is now, according to industry economists, at the 1955-56 figure of over 6 per cent.

Sales are surging upward and are currently at the rate of $11 billion a year. Production in the first half of the year was 17,100,000 tons, a new high level for any six-month period. Current production is at the rate of approximately 93 per cent of rated capacity compared with 88 per cent at this time in 1958.

European Customs Union

A second European Customs Union has been formally launched at a meeting at Stockholm. Officials of Great Britain, Denmark, Norway, Portugal, Sweden and Switzerland have formed what is to be known as the Uniscan Agreement, but more commonly known as the "Outer Seven", as differentiated from the European Economic Community.

The initial purpose will be a joint lowering of tariffs between the participating nations. The British paper and paperboard manufacturers have filed a statement with the members of Parliament, suggesting that to prevent possible concentration of the British market there be included within the new organization an agreement to set future quotas for shipment of paper, related to the current level of imports into Great Britain.

WPUC steps up campaign

The Waste Paper Utilization Council is stepping up its campaign to make certain that waste paper and paperboard used by the industry in the remanufacture of paper boards is free of deliterious components which interfere with the recovery of usable fibers.

Ownership Changes

New Haven Board & Carton Co. has purchased about $1,750,000 of the assets of *William W. Fitzhugh Inc.* Fitzhugh is a producer of folding cartons and corrugated boxes.

A merger in the fine paper field of Massachusetts is announced with the decision of *Whiting Paper Co.* of Holyoke, Mass., and *Romar Tissue Mills* of Wheelwright, Mass., to acquire the property of the Whiting Paper Co. of Holyoke. Whiting will take over the Whiting No. 2 mill which goes into production soon with three machines. Romar secures the No. 1 Whiting mill, but its two machines will not be put into production at once. Romar and Whiting Paper are closely affiliated, with some directors serving both companies.

The merger of *American Box Board Co.*, of Grand Rapids, Mich.; *Central Fibre Products Co.* of Quincy, Ill. and the *Ohio Boxboard Co.* of Rittman, Ohio, has resulted in the formation of the *Packaging Corp. of America.*

A company spokesman stated that the larger corporation will provide additional and improved facilities, greater integration, a wider product range, and a market area extending from New York to Rocky Mountains.

The consolidation brings together facilities producing jute and kraft linerboard, boxboard, bleached kraft, corrugating medium, molded pulp products, egg packaging products, shipping containers and folding cartons and other paperboard products.

Stone Container Corp. has purchased the business of *Acme Carton Co.* of Chicago. This will be the third packaging-manufacturing division in Chicago for Stone Container, whose total operations include four container plants, five carton plants and three paperboard mills.

Champion Paper & Fibre Co. will now operate the *Wertgame Paper Co.* of Kansas City, Mo., as a subsidiary. An officer of the company stated: "The purchase of Wertgame will put a Champion merchant subsidiary farther west than any of its other similar operations.

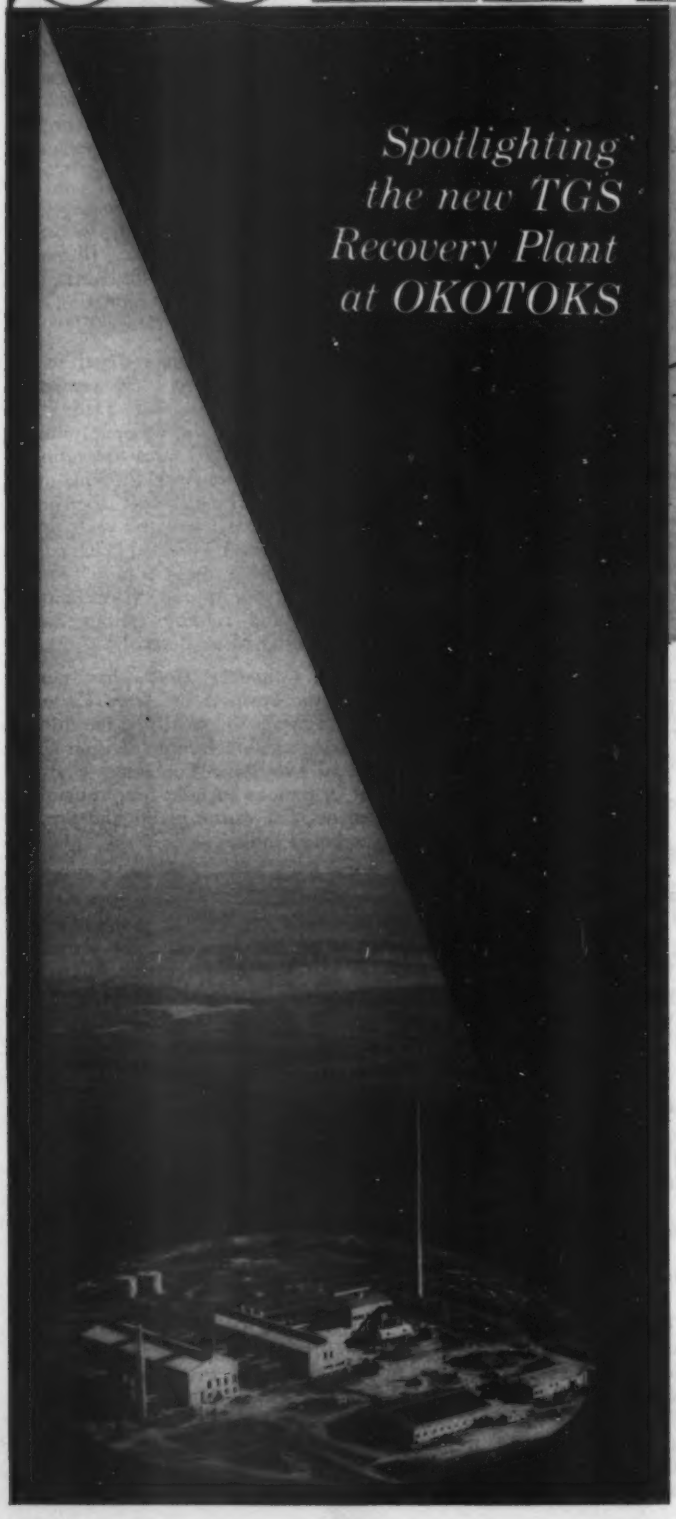
Cotswold Fibres Inc., has been bought by *Rap-in-Wax Paper Co.* of Minneapolis, and will be operated as a wholly owned subsidiary of Rap-in-Wax.

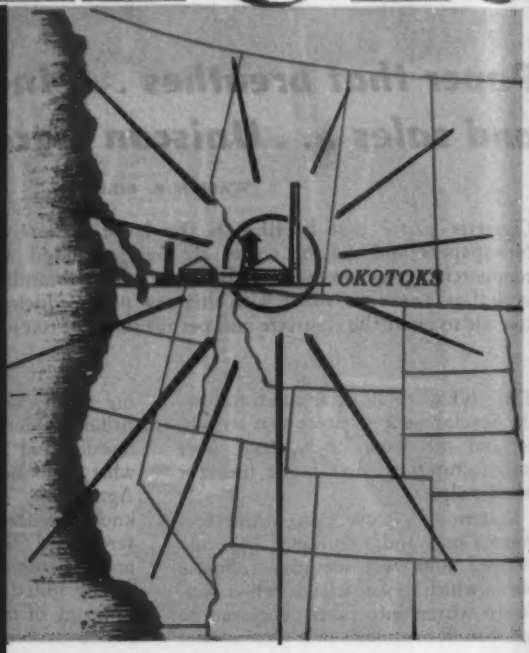
Cotswold Fibres is a producer of polyethylene coated paper and cloth. Rap-in-Wax are makers of protective wraps for food, industrial and home use.

A new corporation to be known as the *Simpson Lee Paper Co.* has recently been formed as a result of a merger between *Simpson Paper Co.* of Everett, Wash., and *Lee Paper Co.* of Vicksburg, Mich.

Simpson Paper operates fully-integrated pulp, paper and converting

SULPHUR





OKOTOKS marks another step in the steadily broadening service being developed by TGS for industries in the States and Canada. Production from OKOTOKS, sitting on top of the vast "sour gas" field a few miles south of Calgary, Alberta, will add a significant tonnage to the supplies of Sulphur already available through TGS to the expanding industries in the Pacific Northwest. OKOTOKS is set up to make shipments of Sulphur in solid or molten form.

TEXAS GULF SULPHUR COMPANY
75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units:
Newgulf, Texas • Spindletop, Texas • Moss Bluff, Texas
Fannett, Texas • Worland, Wyoming
Okotoks, Alberta, Canada

Current Comments . . .

plants in Everett as well as a branch converting plant in Los Angeles. It is a wholly-owned subsidiary of Simpson Timber Co. Lee Paper produces cotton rag content and technical and specialty papers.

The new Corporation will handle the manufacturing, converting and merchandising of both companies.

St. Regis Paper Co. of New York, seeks to acquire *Cornell Paperboard Products Co.* of Milwaukee.

Cornell is a manufacturer of shipping containers, folding cartons, specialty paperboard, fiber wallboard, pulpboard specialties, solid wood pulpboard and boxboards. Cornell's executive offices are located in Chicago, but its principal plant is in Milwaukee.

Net Incomes

Allied Paper Corp.—Six months income, $906,315 as compared with a loss of $170,291 in the comparable period of 1958.

American Writing Paper Corp.—Six months income, $321,346; a year ago, $311,049.

Bergstrom Paper Co.—Six months income, $397,049; a year ago, $356,355.

Certain-Teed Products Corp.—Six months income, $1,672,760; a year ago, $233,894.

Champion Paper & Fibre Co.—Second quarter income, $2,538,000; a year ago, $1,759,000.

Container Corp. of America—Quarter ended June 30, $4,475,000; a year ago, $3,622,000. Earnings for the half year totaled $8,571,000 as compared with $6,950,000 a year ago.

Crown-Zellerbach Corp.—Six months income, $19,266,000; a year ago $14,190,000.

Diamond-Gardner Corp.—Six months income, $4,003,000; a year ago, $3,577,000.

Federal Paper Board Co. Inc.—Income for twelve weeks ended June 13, $1,008,000; a year ago, $941,000.

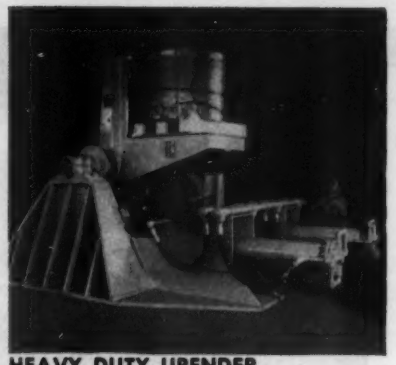
Fibreboard Paper Products Corp.—Six months income, $2,714,717; a year ago, $2,051,231.

Great Northern Paper Co.—Income for 24 weeks ended June 28, $1,578,021; a year ago, $1,165,032.

Hammermill Paper Co.—Income for six months, $1,578,021; a year ago, $1,165,032.

Keyes Fibre Co.—Six months income, $972,061; a year ago, $771,441.

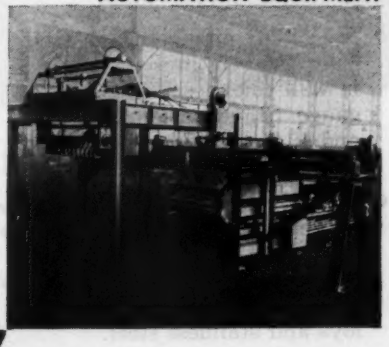
(Continued on page 438)



HEAVY DUTY UPENDER

LOG & CHIP HANDLING SYSTEM

AUTOMATION EQUIPMENT



PV

FINDS THE ANSWERS

"PV" stands for *Planet Versatility* . . . a quality that has made Planet Corporation known throughout industry as an organization that has solutions to the most perplexing production, materials handling, or automation problems.

Planet Corporation engineers apply uninhibited thinking to problems to find workable solutions that increase efficiency. No job is too big or too difficult . . . Planet's "PV" engineers have automated production lines, built bulk and unit materials handling systems, designed complete foundries, developed the world's only true universal transfer device . . . they are experts, in fact, on all types of special handling and automation machinery, and materials handling equipment.

Let Planet demonstrate how its versatile engineering skill, and production and erection know-how can help you. Discuss your problem with a Planet "PV" engineer . . . *it pays to Plan with Planet.*

1826 SUNSET AVENUE • LANSING, MICHIGAN

HOW NAYLOR PIPE CAN FIT INTO YOUR PIPING LAYOUT

There are three areas in which NAYLOR can help you on your piping layouts—with lightweight Spiralweld pipe, standard fittings and special fabrications.

- NAYLOR pipe comes in sizes from 4" to 30" in diameter and in wall thickness from 14 to 8 gauge. Standard lengths of 20 and 40 feet, or furnished cut to exact length specified.
- Standard fittings for lightweight pipe are carried in stock in carbon steel with 10-gauge wall thickness. Also available up to ⅜" thickness in steel, alloys and stainless steel.
- Special fittings fabricated to exact specifications in all materials in a range from 3" to 44" in diameter and wall thickness up to ⅜".

NAYLOR engineers will be glad to work with you in meeting production schedules to fit your requirements.

Write for Bulletin No. 59 and send specifications for quotation.

NAYLOR PIPE *Company*

1233 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

OPEN
for business... felts by Huyck

THE Huyck-Smyth Porosity Tester, being used above, is the *only* practical instrument available to measure porosity of running felts. This device . . .

- **determines when cleaning is needed**
- **evaluates performance of cleaning equipment and other machine components**
- **locates filled or plugged streaks**
- **improves water removal**
- **reduces steam consumption**

It is the most important advance in measuring on-machine felt performance since the development of the Huyckmeter.

Originated by T. C. Smyth of Crown Zellerbach and further developed by Huyck, the Huyck-Smyth Porosity Tester is now available to aid the entire paper industry.

HUYCK FELTS

Huyck Felt Co.,
Rensselaer, N. Y.;
Alicevilla, Ala.;
Division of F. C. Huyck & Sons
In Canada: Kenwood Mills Ltd.,
Arnprior, Ontario.

NEW **HUYCK FELTS** ★ INDUSTRIAL FABRICS

FIRST IN QUALITY • FIRST IN SERVICE SINCE 1870

KEOGELS
Pregelatinized—ready to use —beater starches.

KEOTACS
Cationic—effective— economical wet end additives.

KEOZYMES
Enzyme converting starches for sizing and coating adhesives.

KEOCLORS
Oxidized starches— complete line for sizing and coating adhesive application.

KEOGUMS
New line of corn starch derivatives for sizing and coating adhesive application.

KEOFILMS
Economical—controlled viscosity thinboiling starches for special sizing applications.

TO IMPROVE QUALITY SPECIFY...

OK BRAND

STARCHES ...for every Paper Mill Operation!

TO LOWER COSTS...
call on Hubinger Technical Service. You can depend upon our laboratory facilities and trained field personnel to supply the best and most economical solution to your starch and adhesive problems.

There are OK BRAND products—made especially for every paper mill operation that calls for starches and adhesives. Best of all, there is no extra tariff on any of these top-quality Hubinger items. If your mill needs special starch products to meet improved quality or strength specifications, let our nearest paper-starch technical service representative study your needs. He is prepared to quickly offer valuable aid. Just phone or wire us.

THE HUBINGER COMPANY
Keokuk, Iowa
NEW YORK • CHICAGO • LOS ANGELES • BOSTON • CHARLOTTE • PHILADELPHIA

NEWS of the INDUSTRY

Mills Are Adopting Turbine Aeration

Turbine aeration is a newly developed technique that has been experimentally tested and approved by Wisconsin pulp and paper industry researchers during the past three years to replace oxygen in streams whose oxygen content has fallen below desired levels.

This technique has been put to work by several oxygen-consuming materials which formerly were discarded into rivers. Eight tons of dissolved oxygen are now being added to the Fox River every day between Kimberly and Little Rapids through turbines that have been specially modified for stream improvement by four pulp and paper mills.

Mills currently utilizing tubine aeration on the lower Fox are: Charmine Paper Products Co., of Little Rapids; Combined Locks Paper Co. of Combined Locks; Kimberly-Clark Corp., Kimberly; and Thilmany Pulp & Paper Co. of Kaukauna. Authorities expect that it will be adopted at more and more power plants on streams where higher proportions of dissolved oxygen are needed.

Industrial Waste Conference

The National Council for Stream Improvement Inc., the Institute of Paper Chemistry and the Sulphite Pulp Manufacturers' Research League are jointly sponsoring a North American Pulp, Paper and Paperboard Industrial Waste Conference to be held at the Edgewater Beach Hotel, in Chicago on December 1 and 2, 1959.

The purpose of the conference is to accomplish an exchange of all pertinent basic data relating to pulp and paper industry waste disposal on an inter-regional basis.

The program will be devoted to the broad problems of stream sanitation and waste treatment and waste disposal applicable to all types of pulp and paper wastes.

The conference will be open to all pulp, paper and paperboard manufacturers in North America.

Five general sessions will cover such subjects as: Waste assimilative capacity of streams; Aquatic biology; Solids removal and sludge dewatering; Bod reduction of strong spent pulping liquors; Bod reduction of paper, paperboard and weak pulping wastes.

Clupak Gives Training

More than 40 technical directors and superintendents from 11 of the leading paper manufacturers in the United States, Canada and Sweden assembled for a two-day Clupak paper production training program.

Under the leadership of Hewitt S. Welsh, Clupak's vice president and technical director, the men were given a presentation of the general principles of operation of the extensible units and a detailed explanation of how they are installed. A tour to West Virginia Pulp & Paper Paper mill was also made to give the men a further study of the kraft paper machines.

The two-day symposium concluded with a discussion by Walsh of the research and development activities now underway by Clupak, particularly the new isotropic two-way stretch paper.

James Clark (right), a sales representative for Huyck Felt Co., is seen presenting one of two sets of felts donated by his company to North Carolina State College. The college will use these felts to clothe an experimental paper machine operated by student paper makers in its pulp and paper technology department. Members of the college staff appearing left to right with Clark are: C. E. Libby, professor and head of the pulp and paper department; H. D. Cook, assistant professor of the pulp and paper department and R. G. Hitchings, also assistant professor of the department.

Davis to Study Forest Management

Kenneth P. Davis (Ph.D.), chairman of the University of Michigan Department of Forestry, has received a Rackham research grant for the study of, "How better management can lead to continuous and profitable production of timber".

In his program, Davis plans to make a systematic and thorough study of the design and use of forest inventory controls for continuing forest management. He will make the study this summer and the following two.

To find out what responsible foresters in industrial and public practice are doing will be is first objective. He will then analyze this information to develop some principles and procedures through a published bulletin.

Weston Adopts New Method of Waste Water Disposal

Weston Paper & Manufacturing Co. has developed a new method of disposing waste water at its Auglaize Division located in St. Marys, Ohio.

Instead of pumping the waste water into the St. Mary's river, Weston is now spraying this water over a 50-acre tract, thus returning it to the underground resources from which huge quantities are pumped daily in paperboard production.

UM Starts Research Project

The University of Michigan has started a two-year research project to find out how much heat a tree can endure from a forest fire.

Professor Kenneth P. Davis, chairman of the UM Forestry department stated: "No real information is available on the insulating properties of the bark as it grows on trees. To use fire effectively as a tool to remove undesirable trees, and not injure good ones, we have to know what heat a tree can stand without damage".

New Products and Processes

Atlantic Gummed Paper Corp. of Brooklyn, N.Y., is now using a special "Bi-flexing" operation that is taking the "curl" out of gummed sealing tape. Bi-flexing the paper after gumming contributes to better water penetration and makes the tape lie flatter.

The operation consists, essentially, of cracking what otherwise would be a glassy film of glue on the tape. This prevents all waste due to curling.

The base paper stock used, is kraft paper (60-lb.) made by the Hollingsworth & Whitney Division of Scott Paper Co.

Crown Zellerbach Corp. is dressing a distinctive white wrap on the rolls and skids that contain the company's new Level/Smooth coated book papers.

All of the new packages feature the Level/Smooth family look, which is marked by the Corporation trademark in a two-color design.

Dixie Cup Division of American Can Co. has announced that its "Mira-Glaze" cup is being produced in a seven-ounce tall cup. These cups are lined with polyethylene and are available for vending. These cups use no glue and are unaffected by heat, cold or humidity.

A new line of meat prepackaging boards have been introducted by Patio Paper Products Co.

These boards are made of solid sulfate paper and treated for bloom retention. They come in complete selection of sizes including special dimensions and can be used either for hand or machine packaging.

The company also announces that it will soon be in production of a new style of meat tray to add to the meat prepackaging line.

Results of a five-year research program is now being shared by Owens-Illinois Glass Co. The program ended in the development of a new, stronger type of C-flute corrugated board.

The new board is called O-I C-flute, and is said to offer greater resistance to flat crush than ordinary C-flute through a change in the design of the flute contour.

Benefits of O-I C-flute are being made available to other companies in the box business. S. M. Langston Co., who designed the original roll cutters required to make the special corrugating rolls, has been directed to use the O-I cutter in making rolls for any company that wishes to use them. According to Langston, a substantial number of orders have already been received.

Forestry Notes

The use of balloons to mark fire sites are now being used in an experiment by the forestry branch in the province of Manitoba. The balloons, about 4 ft. in length when inflated, will be attached to a weight and dropped by plane at the fire site. They will be held by the anchor and will float 40 to 50 ft. above tree tops. The balloons will be of color and can be easily spotted by ground-level rangers.

Northern Hemlock & Hardwood Manufacturers' Association has asked the U. S. Senate appropriations committee for an annual appropriation of $290,000 for the Lakes States Forest Experimental Station to widen research on forest diseases. The group said that the current loss of wood volume in this area is due to the lack of research.

Over 58,000 trees on a 34-acre area has been planted around the general office building of the Marathon Div., American Can Co., Neenah, Wis. Two new species of aspen were among the trees planted. One hundred are a cross between the big tooth and trembling aspen. Another 100 are a cross between Swedish and American aspen. This is the first attempt at growing these species in Wisconsin.

A white Linden Moth that has stripped foliage from trees is causing widespread concern in sections of North Georgia, East Tennessee and Western North Carolina. Forest officials said trees defoliaged for the first time will become green again. A second attack by the moth also can be survived, but a third is usually destructive. Research experts are making a check on the egg count in various sections in effort to provide an effective control.

Georgia Forestry Commission has reported that six Georgia nurseries have been accepting orders for seedling trees that can be deliverd in November. Prices for pine seedlings this year are $4 per thousand for long leaf, loblolly and the slash pine; $10 for red cedar and yellow poplar; and $9 for white pine.

Recent Expansions in the Industry

St. Regis Announces Modernization for Three Mills

TACOMA, Wash., mill will commence construction of a new kraft paper and paperboard machine. The new machine will have an initial capacity of 350 tons of kraft paper and board daily, and will increase the rated capacity of the mill to 250,000 tons annually.

Additional pulp manufacturing facilities and auxiliary equipment for the new machine will also be included.

The cost of this expansion program will be approximately $30 million.

DEFERIET, N. Y., Printing Paper Division of St. Regis will spend about $2 million in a program just announced.

This program will include the addition of a two-stage bleach plant to produce 150 tons of bleached groundwood pulp daily; replacement of the groundwood deckering system; modernization of the electrical distribution system, and various machine improvements.

A new Centri-Screen will be added to the No. 1 machine as well as a new suction couch roll and new suction boxes on the fourdrinier. In the sheet finishing department, a mass production finishing line is also being added.

BUCKSPORT, Me., mill will spend over $1 million in a program that will include additions to the mill's wharf paper warehouse and train-shed; improvements on the machine roll equipment of the No. 1 machine; and the building of a second-stage groundwood bleach plant.

Most of the equipment for the improvement of the paper production facilities will be supplied by Improved Paper Machinery Co. Completion is expected to be sometime in November.

Continental Can to Install Steam Generating Equipment

Babcock & Wilcox Co. has received a major contract to manufacture and install steam generating equipment at the new paper mill of Continental Can Co.'s Robert Gair Division in Nixon, Ga.

Valued at more than $2 million, B&W will furnish two boilers, a com-

bination power and bark-burning unit and a Kraft-type black liquor recovery boiler.

The power boiler will operate at a pressure of 875 lbs. psi and a temperature of 900°F at the superheater outlet. It is designed for a capacity of 400,000 lbs. of steam per hour with a two-hour peak capacity of 480,000 lbs. One-third of the boiler's capacity will result from bark firing at a rate of 40,000 lbs. per hour. To meet the mill's steam demands, the bark firing can be supplemented by the burning of natural gas at a rate of 406,000 cubic feet per hour.

Scheduled to go into operation in late 1960, the mill will have an initial capacity of 350 tons a day and is estimated to cost nearly $40 million when completed.

KVP to Expand Production

The Espanola, Ont., mill of KVP Co. will expand its specialty paper production by 15,000 tons a year.

Equipment needed for this expansion calls for a new 136-in. combination Yankee paper machine, a complete stock preparation system, and a Flexiblade off-machine coating unit. The paper machine will be designed for production of machine-glazed and machine-finished papers, particularly in the bread wrapping and waxing field.

A contract for supplying the major equipment has been awarded to Black-Clawson (Canada) Ltd. of Montreal.

Noralyn to Build Multi-Million Dollar Plant

Between $30 and $40 million will be spent by Noralyn Paper Mills of Baton Rouge, La., in constructing a newsprint and semi-chemical pulp mill.

The location is on a 750-acre tract across the Mississippi River from Baton Rouge. The mill is expected to turn out 400 tons of newsprint per day.

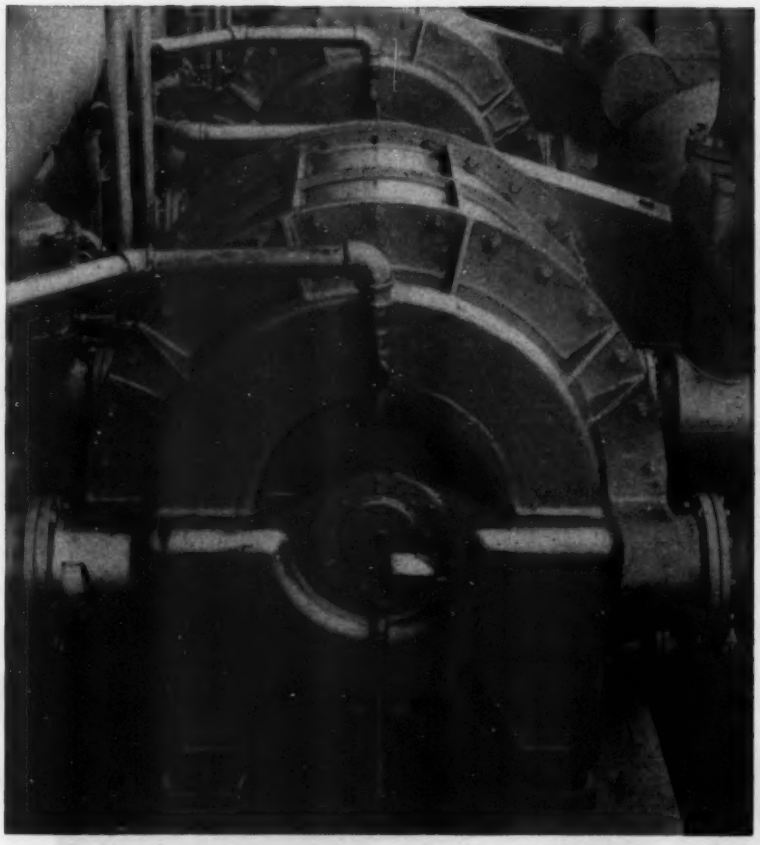
A company official stated that this will be the first mill to produce pulp and newsprint "of exceptionally high quality exclusively from various species of hardwood timber". The company also stated that test runs show its hardwood newsprint to be whiter, with more tensile strength and less transparency.

Kraft Bag Builds New Plant

Construction has begun on a new plant to house the multiwall bag division and the grocery bag division of Kraft Bag Corp. of St. Marys, Ga.

The new plant will be 680 ft. long, of one-story construction, and will probably be completed about February of 1960.

High machine speeds?
High temperature headbox stock?
You need NASH Vacuum Pumps!



Air from the suction rolls on paper machines carries with it substantial quantities of moisture. This considerably reduces the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump, because of the unique principle of operation, the bulk of this vapor is effectively condensed inside the pump. The total capacity of a Nash is therefore increased.

When you specify a Nash Pump it can be closely sized to the job. It is not necessary to select an over-sized unit, because the rated capacity of the Nash may be relied upon.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

441 WILSON ROAD, SO. NORWALK, CONN.

Hardinge Clears Muddied Waters for Provincial Paper

The Thorold Division of Provincial Paper Ltd., Thorold, Ontario, turned to Hardinge Co. Inc. of York, Pa., to help solve the problem of muddied waters that accompanied the dredging program in the Welland Canal — demanded by the construction of the St. Lawrence Seaway.

Engineers from Provincial and Hardinge worked together to custom design a complete water treatment process which would fully meet the mill requirements. Hardinge was awarded the contract for the process equipment, with Provincial handling the construction and installation. Within four months from the time ground was broken for the new water plant, Provincial was pumping water through the new Hardinge system into their mill.

Two Hardinge Flocculation Mechanisms, as seen at the extreme left and right, provide gentle blending of the water to form "flocs".

Operation of system

The water treatment steps of this new system are as follows: First, chlorine and alum are added to the raw water. The alum coagulates the foreign matter into heavy flocs, while the chlorine controls bacterial and slime growth. After these chemical additions, the water enters a 14-ft. by 30-ft. by 15-ft.-deep flocculation tank in which are suspended two Hardinge Flocculation Mechanisms. The revolving paddles of these mechanisms, supported on two sets of horizontal arms, gently blend the treated water to promote further formation of floc for maximum utilization of the chemicals.

The water and floc then flow through staggered horizontal baffles into the clarifier tank, which measures 80 ft. long, 30 ft. wide, 15 ft. deep, where the heavy floc settles to the tank bottom. Two crane-type Hardinge Clarifier Mechanisms continuously remove this settled material to sludge hoppers at the influent end of the tank. These sludge hoppers are provided with drains to waste.

Two 13-ft., 8-in. Hardinge Clarifier units continuously remove sludge from the bottom of this 30- by 80-ft. tank.

One of the two 12½- by 86-ft. Hardinge Automatic Backwash Sand Filters which remove the fine suspended solids from the water.

The water then flows over a weir into a cross channel feeding the two Hardinge Automatic Backwash Sand Filters, each 12½ ft. wide by 86 ft. long. These filters contain a compartmented filter bed with an 11-ft.-deep sand bed supported on porous media plates. Each filter has its own backwash carriage which moves along the full length of the tank, backwashing one 8-in.-wide compartment of the filter bed at a time, with the rest of the filter continuing in operation. The backwash carriage operation is controlled by a natural change in operating liquid levels and is intermittent.

In the sand filters, the fine suspended matter is removed. The clear effluent from the filters discharges over weirs to the clearwell, or filter water storage tank, located directly beneath the filters. The clearwell tank measures 100 ft. long by 40 ft. wide and 9 ft., 9 in. deep, and has a 250,000-gal. capacity.

During the past five years, this water plant has continuously supplied the normal mill demand of 4,500,000 imperial gallons per day. The quality of Provincial's paper has not suffered as a result of the dredging activities.

Inlet turbidities, before treatment, range from 15 to 100 parts per million, with clearwell turbidities after treatment holding near 0 to 1 part per million.

Alum additions are made at an average rate of 10 parts per million for a daily consumption of approximately 400 lbs. Chlorine is fed at an average rate of 75 lbs per day to the raw water, with the filtered water containing a chlorine residual of 0.4 to 0.75 parts per million.

Other than a daily check on chemical additions and general operation, the plant functions without supervision.

U. S. Gypsum to Build Lime Plant

Authorization to construct a lime plant in New Orleans has been given by the board of directors of United States Gypsum Co.

The new plant, which will adjoin the company's gypsum products plant, will produce high purity quicklime and hydrated lime products from shell obtained nearby. This plant will serve the many industries which require lime as an essential material in their processes.

Eastex Adds to Finishing Room Equipment

East Texas Pulp & Paper Co. of Evadale, Texas, has added a new Inta-Roto combination laminator to its finishing equipment.

The laminator will permit laminating and coloring, or laminating and printing one color in the same operation.

At present, Eastex is currently laminating foil, greaseproof and board-to-board using their own fourdrinier and cylinder board as a base web.

Photo by Ewing Galloway, N. Y.

HAM FELTZ says:

"Reminds me of HAMILTON Felts ... they're made to last longer, too!"

YOU CAN'T BEAT

Hamilton

FELTS

"Egypt's venerable, huge, old Great Sphinx of Ghizah is almost 5000 years old! Hamilton Felts can't quite match *that* record, but paper makers *have* found that Hamilton Felts give longest, high-quality performance between change-overs. They help you beat the high cost of downtime by keeping your machines running at top speed ... longer ... turning out more tonnage with less broke or imperfections."

Ask your Hamilton Felt Service Salesman how long-lasting Hamilton Felts can help you reduce the high cost of downtime ... or write us today!

WIN ... *A NEW Spincast Fishing Outfit*

What famous landmark reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. The best letter each month by a paper maker wins a new 1959 model Shakespeare Spincast Rod and Reel—FREE! Every paper maker entrant receives a famous Rex Spoon fishing lure—FREE. Send me your suggestion—today.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

When it comes to Pulpstone Service . . .

your NORTON man is there!

Typical of the men who make up Norton's world-wide service organization of pulpstone engineers is J. H. (Jim) Perry, whose broad technical knowledge and practical mill experience have proved invaluable to pulpstone users throughout the length and breadth of the United States.

No matter where your mill is located, there's a Norton pulpstone engineer, like Jim Perry, within reach. He will be glad to study your mill and to make specific recommendations based on your wood, your type of grinders and the quality pulp you want to produce.

From the Norton plant at Worcester and from Norton Company of Canada's plant at Hamilton, Ontario, Norton pulpstones go all over the world. Each has been carefully engineered to meet the specific requirements of each mill.

Making better products . . . to make your products better

NORTON COMPANY, WORCESTER 6, MASS.
Norton Company of Canada Ltd., Hamilton, Ont.
EXPORT: Norton Behr-Manning Overseas Inc., Worcester 6, Mass.

NORTON
PULPSTONES

Abrasives - Grinding Wheels - Grinding and Lapping Machines Refractories - Electrochemicals - Non-slip Floors - Norbide Products

News of the Industry . . .

Heat-resistant aqueous adhesive and microcrystaline wax are being employed as laminating agents.

New equipment also includes a drying tunnel, a sheeter and layboy for 69- x 72-in. size sheets as well as a rewind for 70-in. wide and 58-in. dia. finished rolls.

International Breaks Ground in Omaha Area

International Paper Co. has broken ground for the construction of a new plant near Omaha.

The plant will produce food containers, corrugated sheets, cartons and various other paper products. Operations at this new plant are set for April, 1960.

Scott Expands at Mobile

Scott Paper Co. of Chester, Penn., has announced plans to spend $10 million to expand its plant at Mobile, Ala. The work, to begin before the end of the year, will boost papermaking capacity in Mobile to 240,000 tons a year from 70,000, according to Scott officials. The work is slated to be finished in about two years.

Fome-Cor's Ohio Plant in Full Production

Fome-Cor Corp's new plant at Addyston, Ohio, is now in full-scale production.

The new plant produces Fome-Cor in panels up to 72 in. wide and in several thicknesses and densities. The plant utilizes a continuous process.

Fome-Cor Corp. was formed earlier this year by St. Regis Paper Co. and Monsanto Chemical Co. It also operates a semi-commercial plant at Mt. Wolf, Pa.

No. 8 Machine Ordered for Longview

Equipment has been ordered for a small Beloit machine which will be installed at the Longview, Wash., mill of Longview Fibre Co.

The machine will be designed to fit into an existing building to produce toweling, creped specialties and lightweight kraft papers. About 50 tons per day is expected of this machine, but it will contribute somewhat more than this amount to the company's total daily tonnage by relieving larger machines of grades on which they do not produce at high rates.

Considerable interchange of parts and equipment with the company's existing No. 3 machine is one of the many design features of the new machine.

The company feels that by having two small machines side by side will give excellent facilities for making small runs of colors and other specialties.

Completion is expected by spring of 1960. Pulp to be used on the machine will be supplied from the existing pulp mill and bleach plant.

Bid Approved on Ohio Plant

Champion Paper Specialties Inc., a new subsidiary of Champion Paper & Fibre Co., has announced that a bid, on its behalf, of $625,000 for the former Piqua Products Co. plant in Piqua, Ohio, has been approved.

At this new location, Champion Paper Specialties will process and sell a line of cut-size business papers, decorated and embossed box wrap, gift wrap and other specialties.

Gordon Fahs will assume responsibility as operations manager in Piqua.

Champion Paper Purchases Plant

Champion Paper & Fibre Co. of Hamilton, Ohio, has announced pur-

Complete Service

DESIGN
by our own engineering staff

INSTALLATION
by our own construction crews

MAINTENANCE
by our own service specialists

of Corrosion-Resistant

LININGS and TILE TANKS

Designed and installed to meet the exact chemical and physical requirements of each installation, Stebbins linings and tile tanks are industry-famous for their efficiency and economy.

Wherever you are — whatever your corrosion - resistance problem may be — it will pay you to take advantage of Stebbins' unequalled design experience and installation facilities.

Write for Bulletin A-158

SEMCO

STEBBINS Engineering and Manufacturing Company

WATERTOWN, N. Y. • PENSACOLA, FLORIDA

STEBBINS ENGINEERING CORP. TOWER BLDG., SEATTLE, WASH.

CANADIAN STEBBINS ENGR. & MFG. CO. LTD. TOWN OF MOUNT ROYAL, MONTREAL 9, CANADA

SINCE 1884

Specialists in Design, Installation and Servicing of Linings and Tile Tanks

News of the Industry . . .

chase of a plant in Piqua, Ohio. The plant will provide facilities for Champion Paper Specialties Inc., a recently formed subsidiary.

Operations at the Piqua plant will be the processing and selling of a line of business papers, box and gift wrap and other specialties.

$40 million Pulp Mill for Nova Scotia

The president of Nova Scotia Pulp Ltd. has stated that actual construction of a $40 million pulp mill will begin at Point Tuper, Nova Scotia next spring.

Carl Clauson of New York inspected the 323-acre site of the mill on the Strait of Canso. He was accompanied by other officials of Nova Scotia Pulp Ltd. and its parent company, the giant Swedish, Stora Kopparberg.

Waldorf Picks Minnesota for New Plant

Negotiations have been completed by Waldorf Paper Products Co. of St. Paul, Minn., for construction of a paper-box manufacturing plant at St. Cloud, Minn.

Work on the plant will be started soon, with completion scheduled for next year on a 54-acre tract near the city.

New Mill is Considered

Menasha Wooden Ware Corp. of Menasha, Wis., has been making economic and engineering studies for a $5 million, semi-chemical pulp and paper mill at Coos Bay, Ore.

Officials emphasized that no commitments have been made. However, if the studies prove favorable, the new mill will probably be under construction in 1960.

Part of the mill's production would be used by Menasha's corrugated box plant at Anaheim, Calif., and the rest would be sold.

Fibreboard Chooses Phoenix for New Container Plant

A Phoenix, Ariz., plant site has been chosen by Fibreboard Paper Products Corp. as a vital location for a new integrated shipping container plant.

Construction of the new plant will be completed by the end of the year. An 85-in. corrugator will be the heart of the plant's operation. It will convert paperboard from Fibreboard's western mills into corrugated board for shipping containers.

Work Begins on Celgar's New Sawmill

The clearing and excavation work has begun on Celgar's new sawmill which will be located at Castlegar, adjacent to the pulpmill site. Completion for this first step is expected by November 30.

Construction on the sawmill will begin early in the spring of 1960. The mill will be designed to make use of the pulp mill utilities and to supply chips to the pulp mill as a by-product of high grade lumber production. Dry kiln and planer installations are some of the other features brought into the design of the mill.

Sulfur Burner Installed at Finch

Finch, Pruyn & Co. Inc. has installed a sulfur burner at its Neutral Sulfite pulp mill.

The purpose of the installation was for use in a new process which will enable the firm to manufacture a continuous supply of sodium sulfite.

Allied News Notes . . .

Antara Chemicals, a sales division of **General Aniline & Film Corp.,** has appointed two new distributors for Georgia and Florida — **Atlanta Solvents & Chemical Co.** of Doranville, Ga., for Georgia and adjacent territories; and **Moss Soap Co.** of Miami, Fla., for the lower Florida area. Both distributors will handle GAF's full line of Igepal CA and CO non-ionic surfactants, Cheelox sequestering agents, ethylene and diethylene glycols, Biopal iodophors, etc.

American Potash & Chemical Corp. has commenced enlarging operations on its sodium chlorate plant at Aberdeen, Miss. The 50-per cent expansion project will raise production capacity at Aberdeen from 15,000 to 22,500 tons per year. Completion is scheduled for October, 1960. The new capacity of the Aberdeen plant, combined with that of the Henderson, Nev., plant, will exceed 50,000 tons of sodium chlorate per year, making the company the world's largest producer. The product is mainly used to bleach pulp and paper used in boxes, bags and wrappings.

Hodge Chemical Corp. of Chicago has completed construction of its enlarged production, laboratory and of-

get CLEANER MORE UNIFORM Chips with ATKINS Silver Steel CHIPPER KNIVES

• HI CARBON
• HI CHROME
Perfectly balanced sets for any machine, any fastening

ATKINS Chipper Knives give you consistently better quality chips . . . with less time out for sharpening. ATKINS special alloy steel and exacting heat treating methods assure the *perfect combination of hardness and toughness* to cut clean and fast without splinters or sawdust . . . and to withstand the heavy shocks of high production runs.

Call your ATKINS Distributor . . . or order direct from

ATKINS SAW DIVISION • BORG-WARNER CORP.
INDIANAPOLIS 9, INDIANA
Branches: Chicago, Philadelphia, Chattanooga, Los Angeles, San Francisco, Portland, Ore.

News of the Industry . . .

fice facilities. The new facilities will be used for product development and application studies on the company's line of antifoams, esters, emulsifiers, flocculating agents and other surface-active chemicals.

M. H. Baker Co. of Minneapolis, Minn., has been chosen as distributor for **Adell Chemical Co.** of Holyoke, Mass., manufacturer of d-i LESTOIL liquid detergent. Baker Co. will service Minnesota and Wisconsin. The distributor renders technical services to the paper and associated industries and will provide test material to plants, wishing to run supervised tests with d-i LESTOIL. The detergent is widely used for de-inking and cleaning raw stock, washing felts and for cleaning the entire system.

Appleton Machine Co. has announced the formation of a European subsidiary named **Appleton International S. P. A.** Foreign offices will be located in Paris, London, Frankfurt and Milan. Appleton International will conduct all sales, service and manufacturing of its parent firm's supercalenders, machine calenders, paper mill and converting winders, slitters and stock preparation equipment. It will also represent **Gilbert bert & Nash Co.** in the sale of air, mechanical, felt and wire paper machine guides. Headquarters for the European subsidiary will be: Appleton International S. P. A., Via Fontana 11, Milan, Italy.

Dow Chemical Co. has recently moved its Northwest sales office to the second floor of the two-story Pacific Mutual Bldg., 307 Broad St., Seattle, Wash. The entire operations area is laid out around a teletype communications hub, which relays customer orders to various Dow manufacturing plants by way of the company's private teletype network. The Northwest office services Dows major product lines — industrial chemicals, plastics, magnesium and agricultural chemicals —in the five-state area of Washington, Oregon, Idaho, Montana and Alaska.

National Starch & Chemical Co. (Canada) Ltd. has begun production at its newly completed vinyl-emulsion polymerization plant at Toronto. The new plant primarily produces vinyls, copolymers and homopolymers in emulsion form. It is built to allow for future increases in capacity. Products from the new plant will be used both internally for the manufacture of adhesives and for sales throughout Canada to manufacturers in the paint, paper coating, textile and allied fields.

The new plant, being built for **E. D. Jones Corp.**, four miles east of the center of Pittsfield, Mass., will be completed by December. The new facility, whose total area under roof is about 195,000 sq. ft., is on 82 acres of land. All office and manufacturing operations, principally located in many multi-story buildings in the center of Pittsfield will be consolidated in this single-floor plant. All buildings are interconnected and arranged so that there is a natural flow of materials from the rough state through the processing bays to the assembly shop.

Daffin Mfg. Co. of Lancaster, Pa., has announced the formation of a new industrial sales division to market many of its products in the industrial field. The products include Daffinaire pneumatic materials handling equip-

ENGLISH CLAYS AMERICAN

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation

6 East 45th Street, New York 17, N.Y.

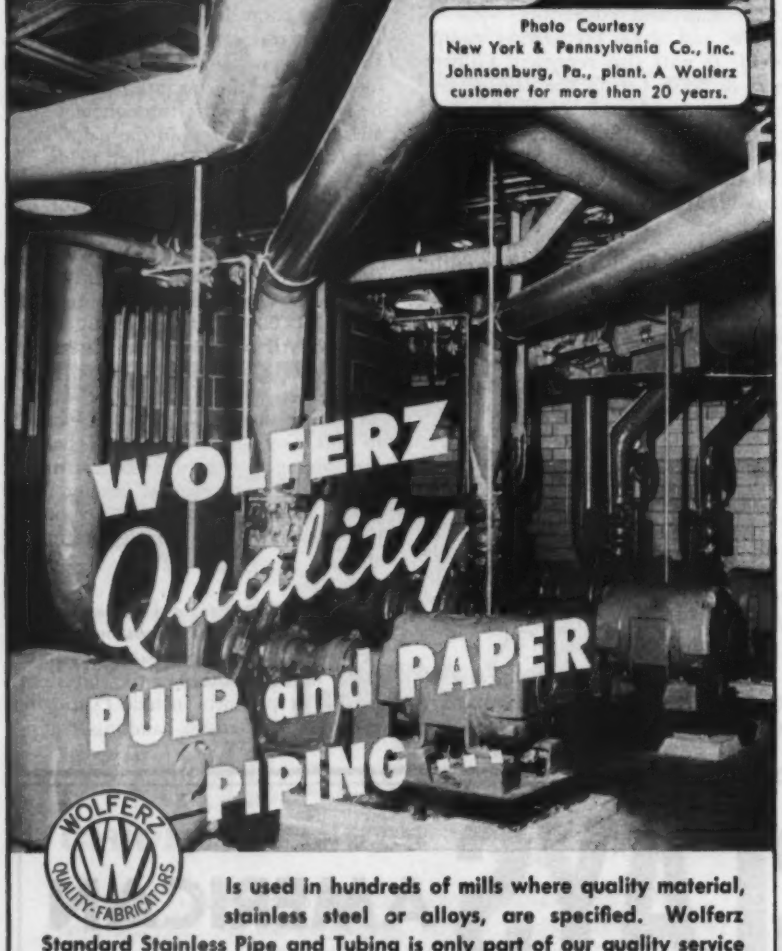
News of the Industry . . .

ment, the two-way conveyor, the one-way conveyor and the pneumatic bulk-truck unloader kit; MacLellan batch mixers; and Daffin pelleting machines; packaged mills and industrial hammer mills.

The leasing of custom-engineered, closed-circuit television systems was announced by **Diamond Electronics Div. of Diamond Power Specialty Corp.**, Lancaster, Ohio. Management of lease-contract arrangements will be done in cooperation with **American Industrial Leasing Co.** of New York City. However, all preliminary arrangements will be made through Diamond Electronics' sales engineers and sales representatives. Lease contrast may include all standard equipment, standard and specialized accessories as desired, cables, spares, applicable purchase taxes and shipping and installation charges.

Insurance is also available at very nominal cost during the lease-base period.

Industrial gear sales headquarters of **Farrel-Birmingham Co. Inc.** has been moved from the main offices in Ansonia, Conn., to the gear manufacturing plant at 344 Vulcan St., Buffalo, N. Y.



is used in hundreds of mills where quality material, stainless steel or alloys, are specified. Wolferz Standard Stainless Pipe and Tubing is only part of our quality service to pulp mills. Head Boxes, Suction Boxes, Starch Mixers, Color Tanks, Agitators, Savealls, Storage Tanks, Pipe Fittings and Flanges can be supplied. Equipment furnished in all grades of Stainless Steel and other alloys.

E. C. WOLFERZ ALLOY EQUIPMENT
20 PARK STREET, BELLEVILLE 9, N. J. Tel.: PLymouth 9-5667

Coming Events

TAPPI

September 15-17—Ninth Corrugated Containers Conference, Jung Hotel, New Orleans.
September 21-23—Fourteenth Paper Plastics Conference, Edgewater Beach Hotel, Chicago.
October 7-9—Fourth Deinking Conference, Roger Smith Hotel, Holyoke, Mass.
October 12-15—Fourteenth Engineering Conference, Penn-Sheraton Hotel, Pittsburgh.
November 4-7—Thirteenth Alkaline Pulping Conference, Robert Meyer Hotel, Jacksonville, Fla.

PIMA

September 17-19—Northeastern Div., Poland Spring House, Poland Spring, Me.
September 30-October 1—Pennsylvania-New Jersey-Delaware Div., Pocono Manor Hotel, Pocono Manor, Penn.
October 1—Michigan Div. (joint meeting with Kalamazoo Valley section of TAPPI), Hotel Harris, Kalamazoo, Mich.
October 2-3—Connecticut Valley Div. (joint meeting with New England Section of TAPPI), Great Barrington, Mass.
October 8-10—Pennsylvania-New Jersey-Delaware Division (fall meeting), Traymore Hotel, Atlantic City, N. J.
October 14-16—Southern and South-eastern Divisions (joint fall meeting, Edgewater Gulf Hotel, Edgewater Park, Miss.
November 5—Michigan Division, Hotel Harris, Kalamazoo, Mich.
December 3-5—Pacific Coast Division (annual fall meeting), Olympic Hotel, Seattle, Wash.

OTHER MEETINGS

September 10-12—Wood Industries Conference, Portland, Ore.
September 13-14—Pacific Coast Conference of the National Association of Waste Material Dealers, Fairmont Hotel, San Francisco, Calif.
September 14-16—National Paper Trade Association Convention, Conrad Hilton, Chicago.
September 21-25—Fourteenth Annual Conference and Exhibit (International) of the Instrument Society of America, International Ampitheatre, Chicago.
September 24—Atlantic Division of the National Association of Waste Material Dealers, Sheraton-Park Hotel, Washington, D.C.
September 27-30—41st National Meeting of the American Institute of Chemical Engineers, St. Paul, Minn.
October 1—Special meeting for professional members of the Packaging Institute, Sheraton-Blackstone Hotel, Chicago.
October 19-23—47th National Safety Congress, Conrad Hilton, Chicago.
November 30-December 4—27th Exposition of Chemical Industries, New York Coliseum, New York.

..Fluid Power news

REPORT NO. 12,105 NEW SECTION AND DRIVE IMPROVES PRODUCT

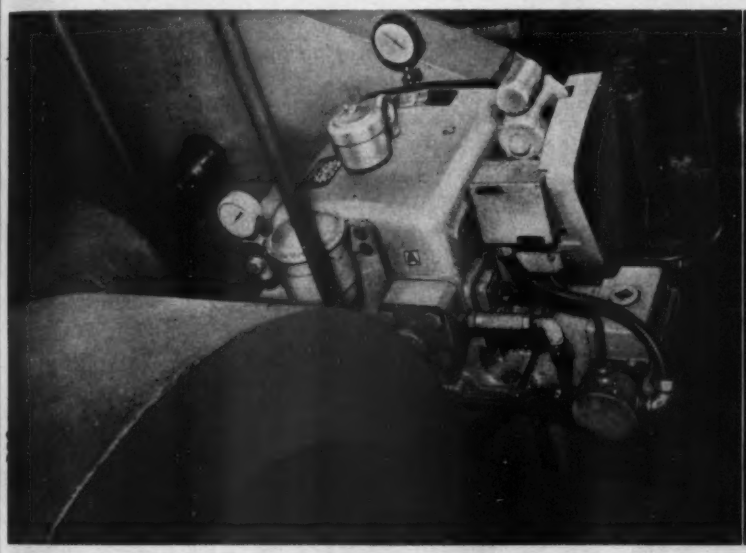
From Oilgear Application-Engineering Files

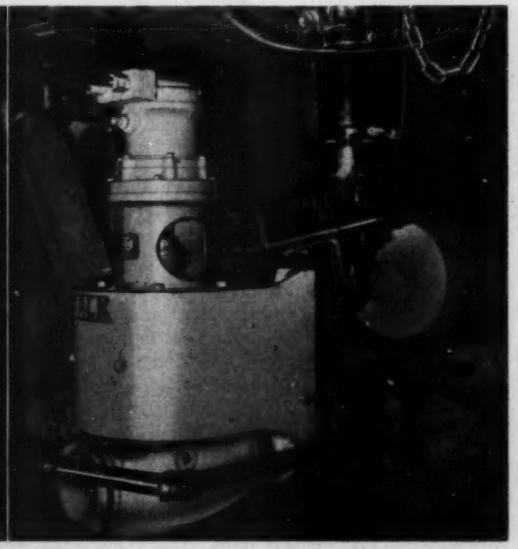
HOW OILGEAR HELPED SOLVE DRIVE PROBLEM FOR A NEW PAPER MACHINE SECTION

CUSTOMER: *A Large Midwestern Paper Manufacturer.*

DATA: To improve the finished surface of certain types and grades of paper, this manufacturer decided to insert a new sizing and smoothing section between existing sections of one of their paper machines. *Requirements: 1.* New section drive rpm must remain in same preset speed ratio with first dryer section roll regardless of over-all machine speed; allow precise, minutely controlled variation to increase or decrease wet sheet tension; hold constant speed within 6% regardless of increase or decrease of section roll pressures. *2.* Section drive to be inoperative at will without use of clutches . . . machine to operate with, or without the new section for dual purpose processing. *3.* Drive must be smooth, positive . . . without lag, shocks, or surges. *4.* Drive must fit within extremely limited, available space, and be direct-connected to new section sizing roll. *5.* Complete, individual control from a convenient, remote, push button station. *6.* Dependability, with a minimum of installation, or maintenance "downtime."

Note: A mechanical drive was considered, but space and control requirements would involve costly, major rebuilding of the entire machine.

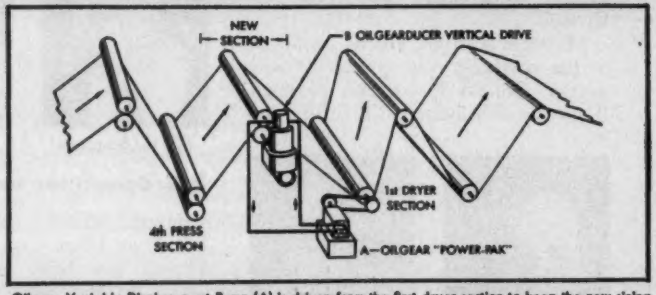




SOLUTION: Oilgear *Application-Engineers*, working in cooperation with company engineers, analyzed the speed, torque, control, and space limitations of this installation; and recommended an Oilgear *"Any-Speed"* drive consisting of a separate, heavy-duty, Oilgear pump and motor for the following reasons. *1.* An Oilgear Type "DE," Variable Displacement Pump with Electric Remote Control and Reservoir fitted into the very limited space available, and could easily be driven from the first dryer roll. *2.* A standard *Oilgearducer*—an Oilgear Constant Displacement Fluid Power Motor with integral right-angle gear reducer—could be direct-connected to the new section sizing roll. *3.* A simple pushbutton station for controlling this new section could be conveniently mounted on the opposite side of the paper machine. *Actual operation has proved that all initial requirements were either met or exceeded.*

Being a positive displacement drive, the direct-connected sizing roll rpm remains in the same speed ratio with the first dryer roll regardless of over-all machine speed. Original constant speed requirement—within 6%—is exceeded in actual operation . . . speed remains stable within 0.5% max. variation under full min. to max. load change. Two remote control station pushbuttons command the electric pilot control motor to increase or decrease pump displacement, changing the hydraulic motor speed and the section to machine ratio . . . precisely varying tension on the wet sheet. Section can be independently started and stopped from this station while the paper machine is running. Exact drive load and temperature are indicated. *In over four years of continuous, high-speed service, there has been no reported maintenance on this drive.*

This paper manufacturer has also Oilgear-equipped a laminator winder drive; the center winder on a super-calender stack; the unwind and rewind drives on another super-calender; five "wet-end" drives of another paper machine;



Oilgear Variable Displacement Pump (A) is driven from the first dryer section to keep the new sizing and smoothing press section speed in direct relation to the dryer section speed. Actual installation is shown in photo above, left. The small, geared-head pump control motor which changes pump stroke can be seen to the right of the pump. Controlled Fluid Power from the pump drives vertically mounted Oilgearducer (B), direct-connected to the sizing roll of the new section . . . as shown in photo above.

plus other applications in the mill and powerhouse. This user, like many others in all phases of all industry, knows that *for the lowest cost per year—it's Oilgear!* Additional drive application data is available—Bulletins 10600, 10051-G, and "News" 3, 5, 8—on request, without obligation.

For similar practical solutions to YOUR rotary or linear drive and control problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1595 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

NAMES *in the* NEWS

Shawano Paper Mills

Jesse H. Trask has become advisor to top management for Shawano. Prior to his new post, Trask held the position as resident manager.

Robert L. Leaf has been appointed to succeed Trask as resident manager. Leaf has been vice president of research and development since 1954.

J. H. Trask

R. L. Leaf

Simpson Lee Paper Co.

This newly formed company (formed by the recent merger of Simpson Paper Co. and Lee Paper Co.) has appointed W. G. Reed as chairman. Prior to this new appointment, Reed was serving as chairman of Simpson Timber Co.

Others who will be serving as directors with Reed will be: Thomas F. Gleed, C. H. Kreienbaum, Maxwell D. Bardeen, Norman Bardeen, Merrill W. Taylor and John C. Howard.

Maxwell Bardeen will be president of the company. Vice presidents will include Donald F. McCall, Norman Bardeen and Albert A. Christian.

W. G. Reed

M. D. Bardeen

Standard Packaging Corp.

Richard W. Maley, has recently been appointed assistant plant manager of the Chemical Fine Paper & Board Div. of Standard Packaging Corp. at Holyoke, Mass. Prior to his new appointment, Maley was production manager of the No. 2 chemical mill.

Garner A. Towne, who has been serving as controller and assistant to the executive vice president for Allied at Plainwell, Mich., will now move to the Chemical Fine Paper & Board Div. as assistant division manager.

Stephen G. Stapley has accepted the appointment as plant manager of the Chemical Fine Paper & Board Div. Prior to this new appointment, Stapley had been production manager of Crocker-McElwain Mill since 1957.

R. W. Maley

G. A. Towne

S. G. Stapley

H. Moore

U. S. Committee for UN

Hugh Moore, chairman of the board of Dixie Cup Co. at Easton, Penn., has been re-appointed to serve on the Advisory Council of the United States Committee for the United Nations. Working through 125 voluntary national organizations, the purpose of the Committee is to "arouse interest in, disseminate facts about the United Nations and to promote the observance of United Nations Day in the United States.

Clupak Inc.

Fred S. Breeland has joined Clupak Inc. as the company's first field engineer. He will travel extensively both in the United States and Canada to advise and assist Clupak licensees in the start-up of the Clupak paper production and to render continuing technical service after start-up.

Dieter O. Muller-Clemm of Ravensburg, Germany has joined Clupak as the company's representative covering continental Europe. He will make his headquarters at Moshainweg 14, Ravensburg, Germany.

Ontario Paper Co.

David F. Kerr has been appointed sales manager for the Ontario Paper Co. Ltd. and its subsidiary, Quebec North Shore Paper Co. Kerr will be located at the company's head office at Thorold, Ont. As sales manager he will assume responsibility for sales activities of the company under the direction of K. F. McGrann, vice president of sales.

Wausau Paper Mills Co.

The appointment of John J. M. Larson as advertising and sales promotion manager has been announced by Wausau Paper Mills Co. of Brokaw, Wis.

Larson's duties will involve the establishment of an advertising department at Brokaw, the creation, direction and distribution of all company promotional efforts, product sampling and relating activities.

Milprint Inc.

The board of Milprint Inc., Milwaukee, Wis., has confirmed the appointment of Shy Rosen as senior vice president. In his new position, Rosen, a director of the company and former vice president in charge of planning, will assist in the general management of the corporation. He has been with Milprint for 29 years.

William Liesenfeld, formerly manager of flexographic printing production at Milprint, has been promoted to the post of manager, technical service for Milprint Overseas Corp. In his new assignment, he will be responsible for the program of making available to Milprint Overseas' 22 foreign affiliates

Top performance, high efficiency and less maintenance are factors which influence the selection of a short coupled pump. Layne Vertical Service Pumps fulfill these requirements and offer the advantages of lower installation and operation costs, low submergence requirements, simple alignment, no priming and less floor space demands. For any short coupled pumping job . . . specify Layne.

Write For Free Bulletins:
LAYNE TURBINE TYPE SERVICE PUMPS—NO. 300
LAYNE PROPELLER AND MIXED FLOW PUMPS—NO. 350

World's Largest Layne Water Developers

LAYNE & BOWLER, INC., MEMPHIS
General Offices and Factory, Memphis 8, Tenn.
LAYNE ASSOCIATE COMPANIES THROUGHOUT THE WORLD
SALES REPRESENTATIVES IN MAJOR CITIES

Names in the News . . .

information and technical services as may be needed for its application in their plants.

Champion Paper & Fibre Co.

Appointments have been made at the paper converting and paper distribution divisions of Champion Paper & Fibre Co.

W. A. Holmes has been named director of finance for the paper converting division. He joined Champion in 1947 and in 1954 served as supervisor, cost accounting section.

George J. Calimafde was named director of finance for the paper distribution division. Calimafde joined Champion last year. He had been a cost and statistical accountant with the U. S. Rubber Co.

Nicholas C. Nelson has been appointed as assistant director of export sales. Prior to his recent joining of Champion, he was manager of the government sales department for Bulkley Dunton Inc. of New York City.

The JAGENBERG MULTI-SHEAR Slitting System

...combines the best features of score cut and shear cut.

Multiple-grooved cutting bushes on air-clamp shaft permit rapid and easy setting.

Wrap-around shaft insures firm guidance of web.

Genuine shear cut action produces clean, sharp cut.

Standard on **JAGENBERG** Pneumatic Winders and Rewinders.

Consult us on equipping your present winders with JAGENBERG MULTI-SHEAR slitters.

Exclusive American Agents:

AMERICAN PAPER AND PULP CO., INC. 300 Fourth Avenue, New York 10, N.Y.

In Canada: **JAGENBERG of Canada Ltd., 209 Davenport Road, Toronto 5, Ontario**

Herty Foundation

R. H. Stevens has announced his retirement from the Herty Foundation. For the past four years, Stevens has served Herty and a few other clients as a consultant. He hopes to continue such activities as circumstances may permit. His 42 years in the pulp and paper industry have embraced a wide field including coarse and fine papers, tall oil, size manufacture and consulting laboratory work on paper mill problems.

Stevens' new mail address is P. O. Box 211, Ridgecrest, N. C.

Mead Papers Inc.

The election of John C. Tuck as vice president in charge of the Dayton Sales Office has been announced by Mead Papers Inc. Tuck joined Mead in August of 1947. Previous to his present promotion, Tuck was appointed manager of sales at the Dayton Sales office in 1948.

Robert I. Coe has been named purchasing agent for Mead Corp's Kingsport, Tenn., Division. Coe assumes the position that was held for 38 years by W. R. Gilmer until his death on May 3. Coe had been assistant purchasing agent since 1954.

USDA

Dr. J. Alfred Hall will retire on August 31 as director of the U. S. Forest Products Laboratory located at Madison, Wis. He will be succeeded by Dr. Edward G. Locke, chief of the world-famed institution's division of wood chemistry for the past eight years.

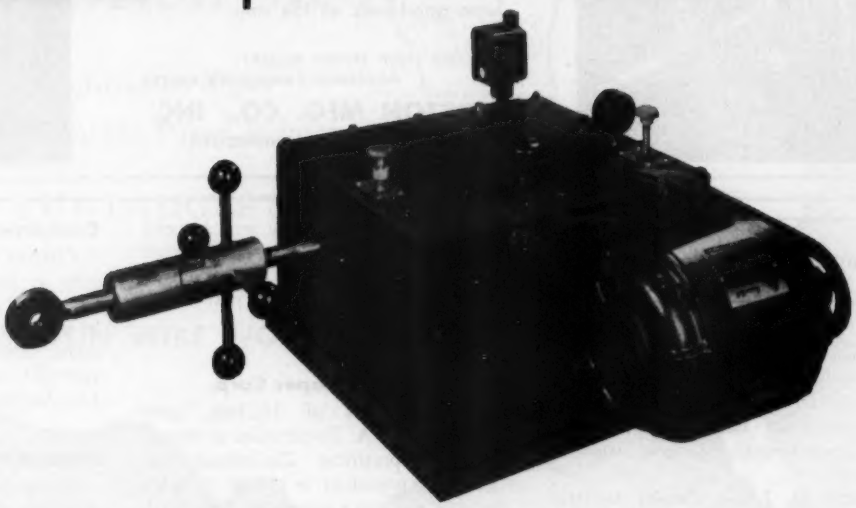
Hall began his forest service career in 1930 as a biochemist on the laboratory staff, specializing in research on the resin production of southern pines. In 1937 he was appointed assistant director of the California Forest Experiment Station at Berkeley. Since then he has been director of the Central States Forest Experiment Station at Columbus; a specialist on research problems with the Forest Service headquarters staff at Washington, D. C.; and a director of the Pacific Northwest Forest Experiment Station in Portland, Ore.

Hammermill Paper Co.

Dr. Donald T. Jackson, who has been Hammermill's technical director since 1954, will continue to head the department as a vice president. He will now be responsible for research and development of all Hammermill divisions and subsidiaries.

William Beckett, president of Beckett Paper Co. (Hammermill's recently acquired wholly owned sub-

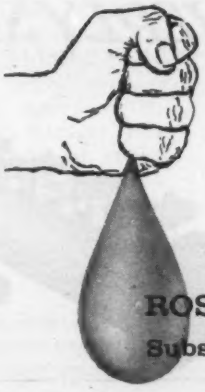
RMF Hydroscillators



positively eliminate wrinkles, hard and soft spots at the winder

A persistent difficulty encountered in the production of salable paper is the formation of wrinkles, and hard and soft spots at the winder. These problems are usually transferred to the rewound roll, resulting in customer complaints and a loss of profits in rejected rolls.

They can be positively eliminated however, with the installation of an RMF Hydroscillator. This simple, compact oscillating device provides a constant horizontal shifting motion, while the sheet is being wound into a roll. This back and forth movement prevents wrinkles from "tracking" and building up throughout the roll. The Hydroscillator can be adjusted by the operator to a wide range of strokes and speeds of oscillation. It can handle the largest mill rolls easily and can be used on practically all present rewinds.



You can determine your need for a modern RMF Hydroscillator by checking your finishing room losses. Rejected rolls or unsalable paper due to wrinkles and hard and soft spots determine the need for a new Hydroscillator.

For more information on this and other products made especially for the paper industry by RMF write to:

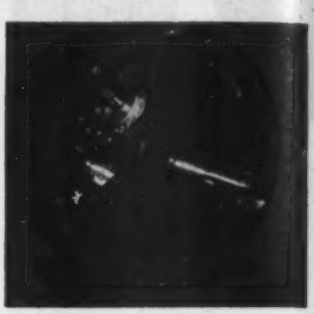
ROSS MIDWEST FULTON · Dayton, Ohio
Subsidiary of Midland-Ross Corporation

STOP TELESCOPING ROLLS • MUSHROOMING CORES

Use HORTON Clutches and Brakes to control the sheet tension on your center winders and back stands. Take the guess work out of tensioning and let Horton equipment give you uniform good rolls all the time.

VARIABLE SPEED CLUTCH PULLEYS
GOVERNOR CONTROLLED BRAKES

HORTON MFG. CO., INC.
MINNEAPOLIS 14, MINNESOTA



Names in the News . . .

sidiary) will now serve as a new member of Hammermill's board of directors.

Hammermill has also announced the appointments of new superintendents:

Joseph D. Lewis, former assistant superintendent, has been promoted to superintendent of the finishing division; Clyde O. Bitting, former chief operating engineer in power, has been promoted to superintendent of the power division. Vincent G. Sheldon, a former division forman, has succeeded Bitting as chief operating engineer in the power house.

The newly formed product evaluation section of the laboratories at Hammermill will now be headed by Harold M. Holmes.

Oxford Paper Co.

Dr. Dan W. Manson of Appleton, Wis., has joined Oxford as a fundamental research group leader.

Oxford also announces the appointment of James M. McClung as plant engineer. McClung will succeed Leon A. Field who has retired from the company. McClung has served as assistant to Field for the past seven years.

Hudson Pulp & Paper Corp.

The directors of Hudson have elected Irwin A. Zuckerman as executive vice president. Zuckerman has been vice president in charge of sales for the company's consumer, industrial and container products, and also has functioned as assistant to the president.

Bruce W. Martin has joined Hudson from Diamond Gardner Corp. to serve Hudson in the capacity of vice president-manufacturing.

Peninsular Paper Co.

Joseph J. Ely has announced his retirement after serving 47 years with Peninsular. In 1912, Ely joined the company as a machine room worker. He became foreman in 1932 and has been superintendent for the past 23 years.

Ely's son, John Ely, will succeed his father as superintendent. John is a 25 year employee.

Container Corp. of America

Charles Gehr has assumed his new post as plant manager of Container Corp. of America's Lake Shore Mill in Chicago. Prior to this new appointment, Gehr was serving as mill manager at Container's 57th Street Mill in Los Angeles.

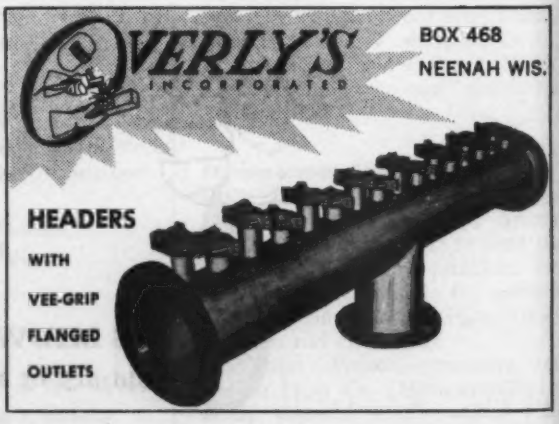
Federal Paper Board Co. Inc.

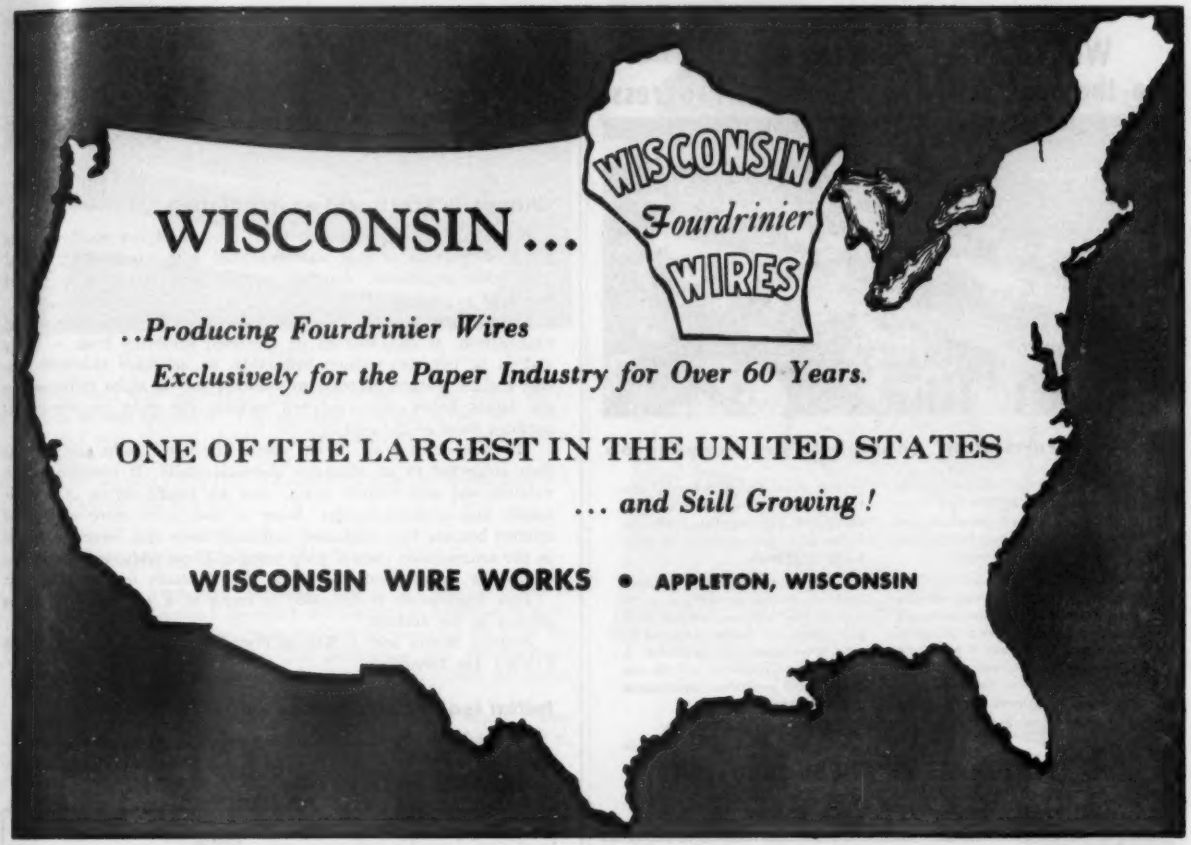
Formerly serving as production manager of Federal's midwest carton operations, Raymond W. Marshall will now take on a new position as resident manager of Federal's National Folding Box Division in New Haven, Conn. Marshall is a veteran of 29 years in the folding carton field and has served Federal for over 20 years.

Wrenn Paper Co.

James S. Evans has been elected to serve as vice president and general manager of Wrenn Paper Co., a wholly owned subsidiary of Metal Corp.

Evans has been acting as general manager since the death of J. J. Hallowell, who was Wrenn's president. Evans is also a member of the board.





Allied Personalities

Louis Calder Honored

An honorary degree of Doctor of Laws was presented to Louis Calder by the Western Michigan University of Kalamazoo, Mich., during the university's fifty-fifth commencement.

During the past several years the Calder Foundation has enabled the University to expand its paper technology equipment through gifts, and currently a gift of $165,000 is being used to build and equip an addition to the paper industry laboratories building.

Haigh M. Reiniger, vice president in charge of sales at John W. Bolton & Sons Inc. and its Emerson Mfg. Co. Div., has resigned. **F. Richard Convey,** Northeastern region manager for the company, has been appointed general sales manager. **John W. Bolton III,** director of market research since 1955, has been promoted to director of marketing services. **Jack H. Reed** has been appointed sales engineer to represent the company to the south.

LESTOIL Inc. of Holyoke, Mass., has announced the recent appointment of **Martin Davis** as sales manager of the firm's LESTOIL m-c Detergent Concentrate Div. He will replace **H. L. Goldstein,** who left LESTOIL to enter his own business. Davis is also in charge of the d-i LESTOIL (paper mill) division. He will continue to work out of the home office.

Four appointments have been announced by A. E. Staley Mfg. Co. **John P. Bolas** became assistant sales manager in the Philadelphia branch. **Robert E. Smith** became sales representative in the Chicago area. **John W. Lusk Jr.** assumed new territorial sales responsibilities at the Boston office. **Dr. Leonard F. Barrington** has been named director of applications research. Barrington succeeds **James P. Casey,** who has resigned to accept a position with Union Starch & Refining Co.

Planet Corp. of Lansing, Mich., supplier of custom designed, engineered handling and automation equipment to industry, has designated **Robert E. French,** Western sales manager for the company, as the new general sales manager and **Robert S. Miller,** Eastern sales manager, as assistant general sales manager. **G. M. Wallace & Co.** of Denver, Colo., will represent Planet in the Rocky Mountain-Intermountain states. In addition to handling all of Planet's sales, Wallace & Co. will aid Planet engineers in manufacturing and installing Planet systems.

Donald W. Curtis has been transferred from Beloit Iron Works to E. D. Jones Corp. of Pittsfield, Mass., to become assistant to the president. In this new position, he will take active part with other members of Jones executive staff in planning to expand the company's facilities and services for the papermaking industry.

The recent appointment of **Robert B. Turk** to the staff of Diamond Alkali Co.'s pulp and paper technical service laboratory has been announced. At this new post, Turk will supervise laboratory projects and technical service assignments for Diamond customers.

Robert H. Boegel has accepted the position of assistant sales manager of Primary products at Clinton Corn Processing Co., Clinton, Ia.

Dilts Div., Black Clawson Co. of Fulton, N. Y., has announced the appointment of **Richard W. Phelps** as

(Continued on page 436)

Welcome to the "university" of Chemical Progress

a 5-day "curriculum" valuable to you and your job

At the 27th Exposition of Chemical Industries you can see and learn more about newest developments in your industry than is available through any other channel.

Under one roof you'll find over 500 exhibits—ways to cut costs, increase production, step up plant efficiency and improve your own products. There will be displays of plant and process equipment, instruments and controls, material handling and packaging equipment, new and improved materials, *plus* special sections for chemicals and laboratory equipment and supplies. Compare, judge new developments in your fields of interest.

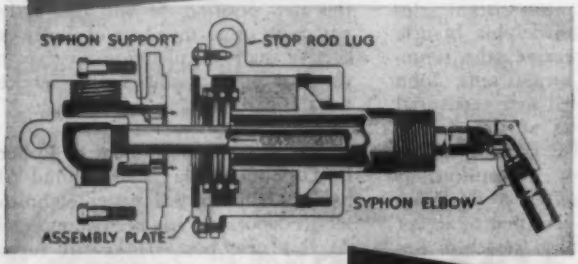
Whether your responsibility is management, design, production or research you will be fortified with new ideas and better prepared to cope with tomorrow's problems. A visit to the Exposition will be one of the most profitable investments you have ever made.

Set these dates aside now—and bring your key associates.

27th EXPOSITION OF CHEMICAL INDUSTRIES
N. Y. COLISEUM • NOV. 30 – DEC. 4.
Management: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

The right rotary joint for every need!

- ON PAPER MACHINE DRYERS
- CORRUGATORS
- CALENDERS
- ROOFING MACHINES
- WAXERS
- EMBOSSERS
- PRINTING PRESSES



Type "SBP" shown is completely self-supporting. Like all Johnson Joints it has no packing, needs no lubrication or adjustment. The syphon elbow replaces unwieldy curved condensate drainage pipes with two straight pipes, hinges to pass right through the joint. Write for Bulletin S-3002. Johnson Rotary Pressure Joints are available for all operating speeds, pressures, mountings.

Johnson ROTARY PRESSURE Joints *First in the Paper Industry*

THE JOHNSON CORPORATION
845 Wood St., Three Rivers, Mich.

FOREIGN ABSTRACTS

Change in kraft pulp on irradiation

A kraft pulp was prepared from pre-hydrolyzed southern pine wood. A portion of this was irradiated with ultraviolet light of 2200-4000 angstroms. Another portion was not irradiated and was kept as control.

The surface of the irradiated pulp sheet showed pronounced degradation, as indicated by its increased solubility both in water and in 10 per cent sodium hydroxide, its increased aldehyde content and its marked decrease in viscosity and in alpha cellulose. In the layers below the irradiated surface, the pulp properties resembled those of the control.

The aqueous extract of the entire irradiated pulp sample was then subjected to an intensive chemical study. It contained both volatile and non-volatile acids, and an entire series of simple sugars and oligosaccharides. Some of the latter were of special interest because they contained arabinose units that were not found in the unirradiated control pulp sample. These indicated the course which the degradation had taken, in its attack on the cellulose.

This degradation is discussed in terms of a working hypothesis offered by the authors.

Andrew Beelik and J. Kelvin Hamilton. *Das Papier* **13**, 77-85 (1959) (in German).

Initial tearing strength of paper

By a suitable modification of the paper strip, the Schopper tensile tester could be used in measuring the force required to initiate a tear from the edge of the paper.

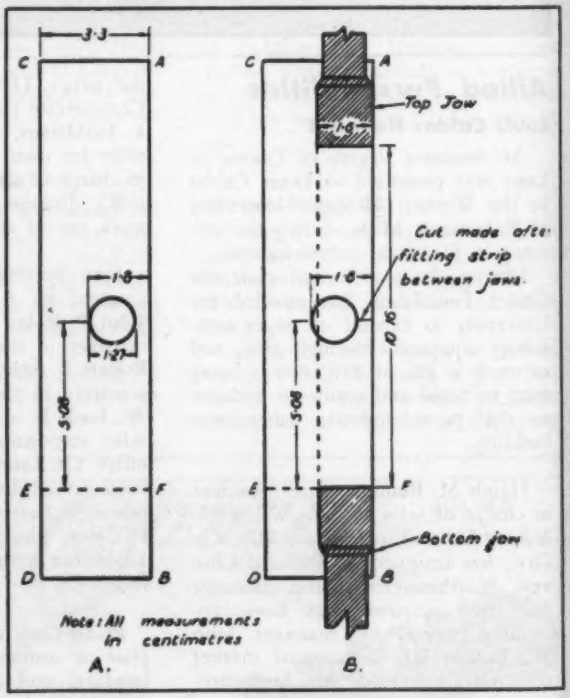


Fig. 1

After a series of modifications, a strip specimen of the type shown in Fig 1. was adopted. The strip is 3.3 × 12 cm. and is cleanly punched in the position shown in the figure.

The precision punch and the punched strip are shown in Fig. 2. The initial tear increased with beating, similarly to the burst factor and to the breaking length, but showed little relationship to the tearing strength as measured by the conventional method.

Fig. 2

From test data and from a consideration of the stress distribution in the specimen, it is apparent that the initial tear value obtained with normal sheets may be predicted from their tensile strength.

A. J. Watson, *APPITA* (Australian Pulp & Paper Ind.)12, No. 5, 140 to 146 (1959).

Palustric acid in tall oil

Following a very brief literature review, the author refers to his work with Gasland in which he isolated palustric acid from tall oil. This finding requires a revision of previous ideas on the composition of tall oil rosin. The advantages and disadvantages of the presence of this acid in tall oil are outlined from the standpoint of its commerical utilization.

One figure and eight references are given. H. H. Bruun *Paperi ja Puu* (*Finland*) 41, No. 3, 73 to 75 (1959) (in Swedish with brief English summary).

Stability of alkaline peroxide solutions

This is the first of a series on peroxide bleaching. The decomposition of a peroxide solution (1.3 gal. per liter) having a high pH and kept 3 hrs. at 60°C. in polyethylene containers reached a maximum of 35 per cent. When kept in glass bottles that had been rinsed, but not with dichromate solution, this decomposition reached 80 per cent at pH 11.

The stability of these solutions decreased when copper or manganese ions were present, but not when calcuim, aluminum, lead or ferric ions were in these solutions. Magnesium sulfate, especially in the range of PH 10.5 to 11, and silicates at pH below 10 to 11 both had stabilizing effects on the peroxide.

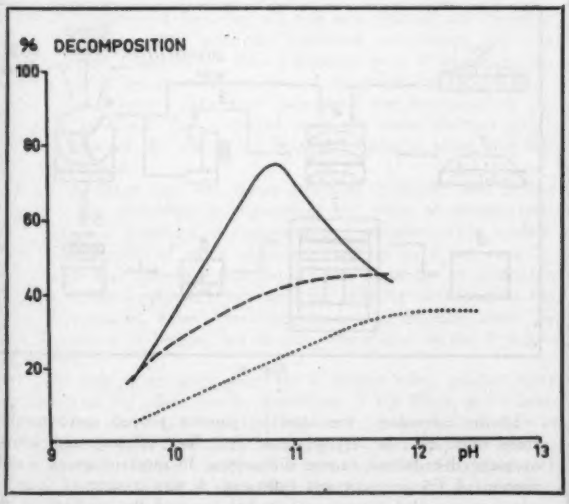
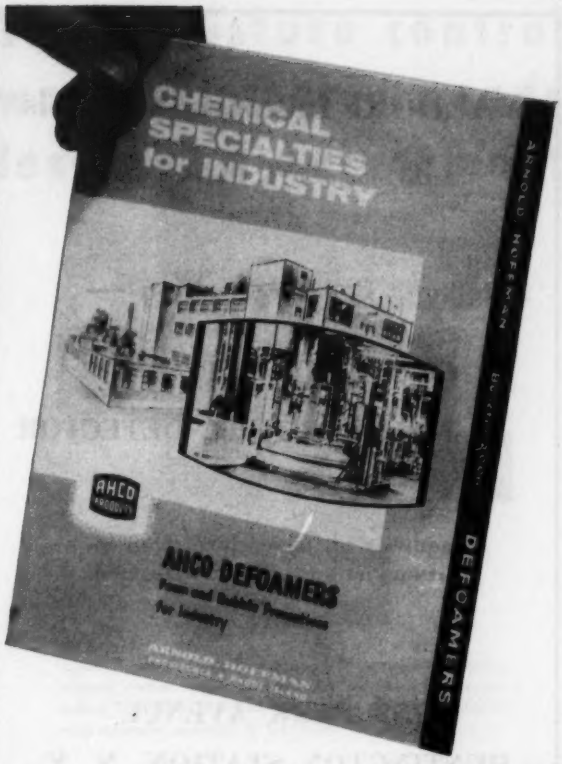


Fig. 3

Fig. 3 shows the percentage of decomposition of the peroxide in glass not washed with dichromate (solid graph), glass washed



Send NOW
for the new
ARNOLD, HOFFMAN
report on
Foam and Bubble Preventives

To make your job easier, we've just prepared this fully-detailed report on AHCO Defoamers — written in convenient what-to-use and how-to-use-it style. Send for Bulletin 2003.

OTHER AHCO PRODUCTS FOR PAPER

- DETERGENTS
- REWETTING AGENTS
- EMULSIFIERS
- COATING ADDITIVES
- PENETRANTS
- PITCH DISPERSANTS
- PLASTICIZERS

Talk To An Arnold, Hoffman Representative:

PROVIDENCE . . . . . 55 CANAL STREET
ATLANTA . . . . . 3219 CAIN'S HILL PLACE
CHARLOTTE . . . . . 2130 NORTH TRYON STREET

Quality AHCO PRODUCTS Integrity

ARNOLD, HOFFMAN & CO., INCORPORATED
55 Canal Street, Providence, Rhode Island • Est. 1815
A Subsidiary of Imperial Chemical Industries Limited, England
West Coast Representative: Chemical Manufacturing Company, Incorporated of California

691-8

WALDORF Industrial Controls

A Division of F. C. Huyck & Sons

Automatic Paper Inspection —

- **CICO LUMP DETECTOR**
- **WALDORF HOLE DETECTOR**

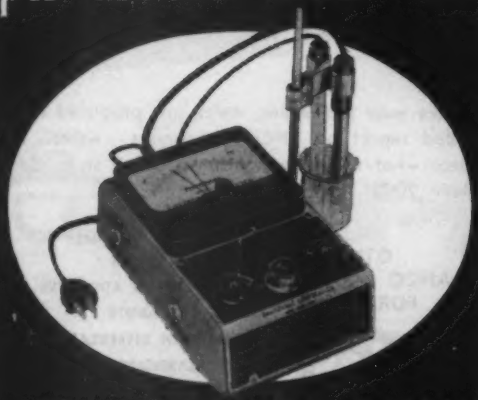
Inquiries on paper inspection instrumentation will be welcomed.

755 PARK AVENUE

HUNTINGTON STATION, N. Y.

PHOTOVOLT

pH Meter MOD. 115



A full-fledged line-operated pH Meter of remarkable accuracy at the moderate price of $175.-

PHOTOVOLT CORP.

95 MADISON AVE NEW YORK 16 N Y

with dichromate (broken lines) and in polyethylene (dotted lines).

Attempts to cut down the catalytic action of the manganese ion by forming complexes with either ethylenediamine tetraacetic acid or with polychelating agents were successful, but only when enough of the complex-forming reagents were present to also combine with the calcium in the solution. Since such additions were usually quite high, the use of complexing reagents was normally uneconomical.

Thirteen references, 14 figures and four tables are included. A. N. Hartler, E. Lindahl and C. G. Moberg. *Svensk Papperstidn.* 62, No. 8, 269 to 76 (1959) (in Swedish with German and English summaries).

Heat conductivity of homogeneous materials

The author describes the construction and operation of a new apparatus used for determining heat conductivity, specifically in the shell of drying cylinders. It was designed on the principle that a heat wave travels through such material with a velocity dependent on the thermal conductivity of the metal. Results were obtained from measurements made on two Yankee cylinders and on one test plate.

Four illustrations, one table and two references are given. A. L. Janson. *Svensk Papperstidn.* No. 62, 21 to 4 (1959) (in Swedish with very brief German and English summaries).

Hardboard made by two processes

This article, from the State Institute for Technical Research, first describes production methods used in hardboard manufacture, and the physical and chemical changes taking place in such processes. Following this, the methods using air-felting are described, then the advantages and disadvantages of dry and semi-dry processes are discussed and compared with the normal wet process.

The object of the present laboratory study was to determine the feasibility of dry and semi-dry process as applied to conditions in Finland, and to determine the effects of different process variables on the properties of air-felted hardboard. The species used were Finnish pine and birch. Bauer fibers and fibers from a defibrator were taken from hardboard mills. In a limited study, fibrous materials from dry planer shavings were also examined. Full details of the procedures used are given.

The principal results of the study may be summed up as follows—Suitable pressing conditions are 190°C., with an initial pressure of 60 kg./cm² and 10 kg/cm² in the second stage. The time of pressing is 1.5 min. in the first, seven min. in the second stage (in the dry process) and eight min. in the semi-dry process. The initial moisture content should be below 10 per cent in the dry, and about 30 per cent in the semi-dry process.

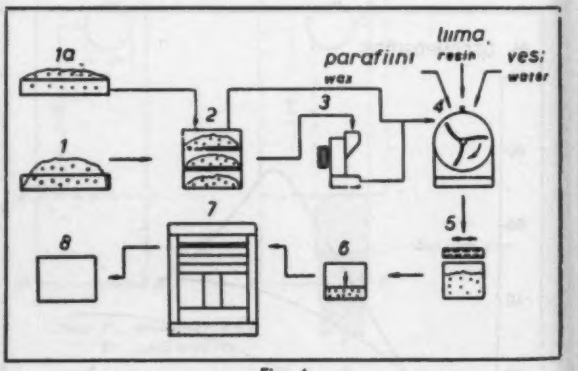


Fig. 4

In the laboratory, the semi-dry process proved more troublesome than did the dry process; i.e., fiber clusters and uneven moisture distribution caused difficulties. In most instances a resin content of 1.5 per cent was sufficient. A wax content of 1 to 1.5 per cent retarded water sorption but lowered the strength of the board.

The fiber size had a market effect on the properties of air-felted hardboard, and the removal of coarse fibers and fines by screen-

ing improved board properties. Although the water absorption of birch board was somewhat higher than that of pine board, the former was somewhat stronger than the latter. By spraying water on the surfaces of the mat, the strength smoothness of the board was increased slightly. A surface layer of fines gives a better appearance to the board but lowers its strength. Heat treatment of the board decreases its water-absorptivity without having any effect on its strength. Oil tempering improves the strength of the board and lowers its hydroscopicity. Fig. 4 shows schematically the method of preparing boards in the laboratory. (1 shows wet fibers; 1A indicates dry fibers; 2 shows drying; 3, dispersing unit; 4, resin blending; 5, forming; 6, pre-compressing; 7, pressing; and 8 illustrates trimming and humidification.)

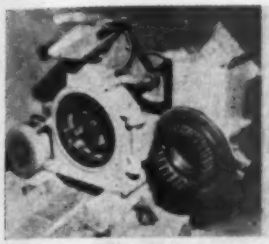


Fig. 5

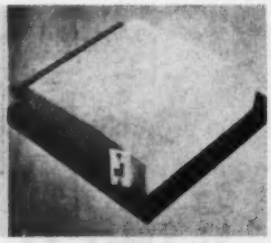


Fig. 6

Fig. 5 shows the impact mill used for dispersing lumps of fiber. Fig. 6 shows a mat formed prior to pressing.

Twelve figures are given. Osmo Liiri, *Paperi ja Puu* (Finland) 41, No. 3, 85-96 (1959) (in Finnish with English summary and captions in Finnish and English).

Physical behavior of pulps

This is a study made in the Division of Forest Products at Melbourne, Australia, which showed the dependence of drainage and flow characteristics on the degree of beating.

Kraft pulps prepared from pine wood and from eucalypts were beaten to various degrees in a Lampen mill and with a Valley beater. Drainage resistance of these pulps were calculated from rate-flow data obtained on a handsheet machine. Flow resistance was measured by means of a rotational viscometer.

The authors then examined possible relationships between drainage resistance, equilibrium water retention, freeness and the degree of beating. Great variations were found for the different pulps and also for the types of beaters used. Before beating, the ratio of the drainage resistance of a eucalypt pulp to that of a pine pulp was about 9 to 1.

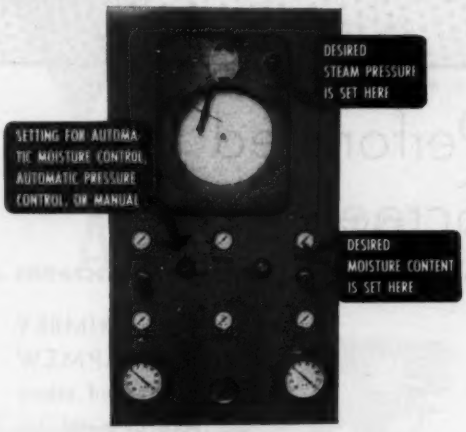
When beaten in a Lampen mill this was reduced; on the other hand it was increased when the hydration was carried out in a Valley beater. Qualitatively these variations were in harmony with the previously known characteristics of the pulps and the performances of the beaters. However they show the sensitivity of the drainage resistance (as compared with the usual freeness data) as an index of the effects of beating especially when this has been prolonged.

Thus drainage data and water retention might be used in the case of some furnished in augmenting the value of routine freeness tests. The behavior of various fiber suspensions were studied, and the influence of stock concentrations, up to 2 per cent, on the yields and flow-rate was determined. Increases in hydration and fibrillation apparently increased the effective viscosities of the pulp suspensions. Fiber shortening tended to decrease them. So the net effects of beating are actually determined by the dominating factor.

In the case of eucalypt pulp, the hydration effect predominates over that of the effect due to shortening of the fibers, and viscosities are increased. However for long fibered pulps (like that from *Araucaria klinkii*), fiber shortening gives rise to a drop in viscosity. For pine pulps these effects are nearly balanced. This data may therefor explain some of the contradictory statements in the literature.

Sixteen references are included. Valerie Goldsmith, J. De Yong and H. G. Higgins. *APPITA* 12 185-200; discussion, p. 200 (1959).

This moisture control works faster...needs less hand adjustment


DESIRED STEAM PRESSURE IS SET HERE
SETTING FOR AUTOMATIC MOISTURE CONTROL, AUTOMATIC PRESSURE CONTROL, OR MANUAL
DESIRED MOISTURE CONTENT IS SET HERE

Control panel of Stickle Pres-ten-trol automatic moisture control system houses controls and instruments for regulating, indicating and recording steam pressure in dryers and moisture variation in the sheet.

Only the improved Stickle automatic Pres-ten-trol moisture control system offers all these benefits . . .

1. Automatically maintains exact moisture content desired in any type paper or board within ½ of 1% guaranteed—regardless of machine speed.

2. Records or indicates moisture variation of sheet, steam pressure in dryers, time and duration of breaks.

3. Instantly regulates steam flow to dryers within preset limits. Violent fluctuations are eliminated by using both tension and pressure controls in dual operation.

4. Maintains desired steam pressure in dryers when paper is off the machine for start-up, wash-up, or wet end breaks. When break occurs, "electric eye" control shuts off steam or maintains steam pressure at preset level; restores proper moisture content up to 8 times faster than other controls.

5. Provides convenient adjustment and monitoring, with all controls and instruments located in one panel as shown above. No hydraulic pistons, chains, pulleys or weights.

6. Eliminates hand adjustment except where slight changes are desired for sharper control.

7. Reduces steam consumption because it admits only enough steam to maintain required moisture content.

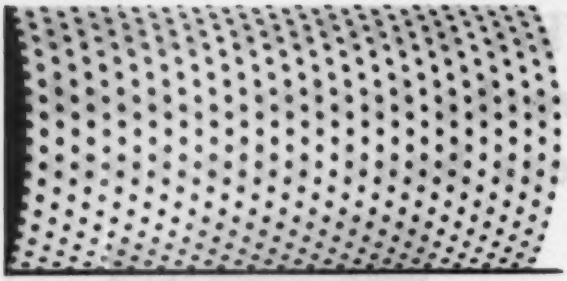
Before you install any moisture control, get all the facts on Stickle's Pres-ten-trol. Write today for free Bulletin 360-C.

STICKLE STEAM SPECIALTIES COMPANY

2215 Valley Ave. • Indianapolis 18, Ind.

Moisture Control Systems
Dryer Drainage Systems
Feed Water Heaters
Vacuum Pumps
Micro Adjustable Orifices
Differential Control Valves

Stickle Equipment
Cuts the cost of steam



Perforated
Screen Plates
for all types of centrifugal screens

SHARTLE TRIMBEY
COWAN APMEW
IMPCO and others
all types of metal

Fitchburg Screen Plate Co., Inc.
301 SOUTH STREET FITCHBURG, MASSACHUSETTS
Made at National Perforating Corp. — a subsidiary

ROGERS
KNIFE GRINDERS
HEAVY DUTY
SERIES
220

Pictured is standard 210" Model 220 equipped with 15 HP Motor and 20" Segmental Grinding Wheel.

Rogers Heavy Duty Model 220 Grinder furnished in sizes from 78" to 240" with mechanical or hydraulic drive. Grinding Heads from 10 HP to 40 HP with segmental grinding wheels from 16" to 30" diam. Rogers Grinders have guaranteed built-in accuracy to produce the best grinding results. Many models and sizes from which to choose. Write for complete information.

SINCE 1887
SAMUEL C. ROGERS & CO., INC.
2070 SHERIDAN DRIVE • BUFFALO 23, NEW YORK

PATENT REVIEWS

MELVIN NORD*

Automatic backwashing water filter

U.S. 2,828,017, granted to Halmer A. Ronningen, Robert M. Ronningen, William J. Petter and assigned to the Ronningen-Petter Co., describes a new automatic backwash water filter that operates by differential pressure on a dirt cycle rather than on a time cycle. It is shown in Fig. 1.

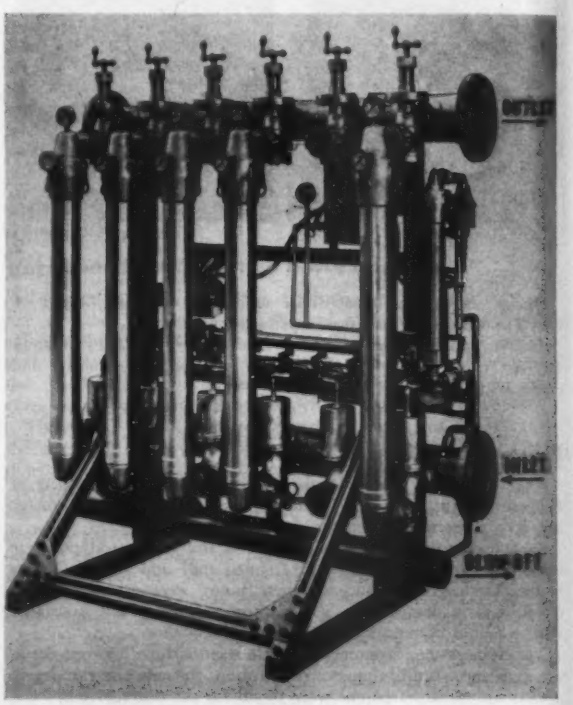


Fig. 1

The automatic backwashing water filter has a primary object of providing fully automatic operation with little or no attention on the part of the operator, by having the differential-in-line pressure (between the incoming and outgoing water) control the backwashing action. As the filter media becomes partially clogged by impurities, the outgoing line pressure of filtered water will drop relative to incoming pressure. This differential in pressure will initiate and control an entire backwashing cycle, solely according to need.

A further object of the water filter is to provide a plurality of individual filters upon inlet, outlet and blowoff headers, each with quick couplings and valve controlled, so that any filter may be quickly and easily removed from the line without shutting down the operation of the main unit. "Off—Inspect—On" in a matter of moments and no tools are needed. This is very desirable construction in that filters may become plugged or in need of repairs; it is preferable to accomplish this without shutting down the machine.

The new filter provides positive, non-short circuiting filtration so that no dirty, unfiltered water will be able to sneak around the ends. This is accomplished by utilizing filter screens sealed at both ends and mounted upon strengthened perforated inners. In addition, baffles and internal rings are provided for diverting the backwashing fluid out through the mesh and assuring clean filter media.

It provides electrically welded and continuously formed filter elements so that they may be "soured out" with a 10 per cent

*Patent attorney, 17600 Pinehurst, Detroit 21.

inhibited muriatic acid and a 90 per cent water solution; and be so strengthened that even in case of partially clogging or blinding the screens, the filter element will not collapse, even with 150 psi. differential pressures.

This automatic filter also can be manually operated in the event of power failure or other electrical mishaps. Each and every filter can be backwashed or blowndown manually by simply operating a small pilot valve mechanically. Also, the electrical control circuits are so designed that manually operated switches are connected to over-ride the automatic pressure-sensing switch.

These automatic backwashing filters are constructed of bronze and copper with either monel metal or 316 stainless steel filter elements of 20 through 700 mesh. Pressure is up to 200 psi., temperature is up to 200°F, and capacities are up to 1000 gpm. Component parts are in stock and shipment takes from six to eight weeks. Further engineering data on manual or automatic filtration problems will be gladly furnished by the Ronningen-Petter Co. of Vicksburg, Mich.

Bleaching of pulp sheets

U. S. 2,872,280, issued February 3, 1959, to Robert R. Kindron and assigned to Food Machinery & Chemical Corp., describes a method of bleaching cellulose pulp sheets by absorbing alkali in the pulp and then applying hydrogen peroxide.

It is found that uniform-sheet impregnation results if the essential bleach-bath ingredients of hydrogen peroxide and alkali are applied to the sheet in two separate operations.

Anti-skid coating composition for containers

U. S. 2,872,094, issued February 3, 1959, to Elmer E. Leptien and assigned to St. Regis Paper Co., describes anti-slipping compositions for application to kraft bag stock.

The compositions consist essentially of 3 to 15 per cent of colloidal silica, 3 to 15 per cent of finely-divided extender material (such as clays, talc, diatomite, insoluble carbonates or insoluble magnesium salts), a non-ionic, polyalkylene-ether wetting agent, an emulsified, dimethyl-polysiloxane foam suppresser and water.

Suction-box extraction apparatus

U. S. 2,877,693, issued March 17, 1959, to Ernest A. Poirier, describes an improved suction box.

In the apparatus of the invention, there are present a number of novel components, including a valve-controlled, suction-box arrangement; a special vacuum header construction; a manifold for connecting the suction-box arrangement and vacuum header construction; and a dropleg and seal-chest assembly for conducting water away from the vacuum-header member at relatively high velocity to provide a working vacuum.

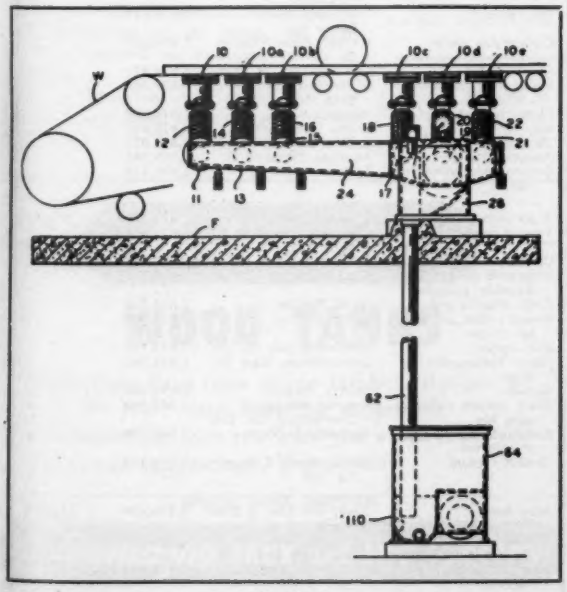
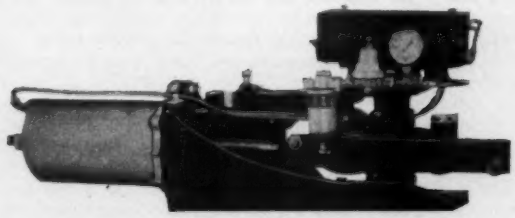


Fig. 2

START with THIS...

...ADD THIS...



...AND YOU GET THIS...

The most accurate control valve you can find!

Long the standard for pulp and paper mills everywhere, DeZurik Automatic Control Valves combine several distinct advantages.

The orifice retains the same diamond shape throughout the control range, eliminating plugging and packing with stock. Straight-thru flow assures *constant* flow without variations.

The response of the operator is instant and without backlash. It has extreme sensitivity to respond to the *slightest* variation in signal.

And its versatility is almost limitless. Flow characteristics can be changed easily and quickly by replacing a cam in the positioner.

For more information, write for Bulletin 150.

DeZURIK CORPORATION
SARTELL, MINNESOTA

In Fig. 2, the numerals 10, 10a, 10b, 10c, 10d and 10e represent a series of conventional suction boxes over which runs a web of paper W on a wire member. Each of the suction boxes is connected through a valve 11 into a manifold 24 and vacuum-header casing 28 which is mounted on floor F.

Each of these valves is so designed as to open or close automatically at a predetermined vacuum. Thus, it is possible to maintain a substantially constant vacuum range — the number of suction boxes operating being dependent on the operating conditions, such as changes in the flow of water.

The relatively stabilized flow of water thus realized from a substantially constantly maintained vacuum range is conducted to the header at relatively high velocity. For this purpose, manifold 24 has a particular shape. A bottom side extends downwardly to communicate with an opening at the top of the header case 28. The sides of the manifold and its top are formed so as to taper inwardly from a width which includes all of the suction boxes to a relatively constricted passageway which coincides in size with the inlet opening in the header casing and which will provide for high-velocity flow just at the point of opening into the header casing. Water is thus drawn from several points and converged with a minimum of change of direction, whereby turbulence is minimized.

The high-velocity flow of water, thus produced by the restricted end of the manifold and delivered to the header casing, is next guided along a path to provide for step-by-step drop leg operation and to impart vertical flow to the greatest extent possible to this water as it approaches and passes through respective drop legs.

The patent describes the operation and construction of drop legs 62 in detail. These drop legs extend through floor F to a seal chest 64 below the floor, in order to produce an appreciable drop for the water falling through them, thus producing a desired working vacuum. The number of drop legs in use at any given time is also dependent on the volume of water carried away from the web of paper on the wire.

Method of simultaneously bleaching and coating of paper

U. S. 2,875,102, issued February 24, 1959, to Robert L. McEwen, Charles W. Raleigh and Carl E. Price and assigned to Food Machinery & Chemical Corp., describes a method of manufacturing a coated, bleached paper sheet in which the coating and bleaching operations proceed simultaneously.

The invention is based on the discovery that bleaching agents which are reducing agents (e.g. sodium hydrosulfite, sodium bisulfite, zinc sulfoxylate formaldehyde, etc.) have no bleaching effect on the coating materials generally used (e.g. clay, titanium dioxide, etc.), but effectively bleach the paper or fibrous stock to be coated. They will do so under the same conditions, with the same equipment and with the same technique as is commonly used for coating papers containing prebleached pulps on a paper-machine coater.

Flameproofing of fiberboard

U. S. 2,875,044, issued February 24, 1959, to Lewis R. Dunn and Lewis W. Eckert and assigned to Armstrong Cork Co., describes a method of fireproofing fiberboard. The product is resistant to blooming at high humidities.

The surface of the fiberboard is treated, while still in a wet condition prior to drying, with a solution of boric acid so that it penetrates into the body of the board below the surface. The product is then heated to react the boric acid with the cellulosic fibers at 240°F. The dry product is then coated with a composition including clay or similar finely divided inorganic particles and a flame-resistant binder.

Headbox for papermaking machine

U. S. 2,881,674, issued April 14, 1959, to Charles G. R. Johnson and Charles A. Lee and assigned to Kimberly-Clark Corp., provides an improved headbox type, stock-delivery mechanism for use in conjunction with fourdrinier-papermaking machines.

The invention is based on the discovery that better formed paper products can be made when the stock, flowing into and through the headbox, is maintained under dynamic conditions of controlled fine-scale turbulence. This requires one or more turbulence generating and/or regenerating zones within the system.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Head box for papermaking machines	Black-Clawson Co.	2,870,690	1/27/59
Fourdrinier papermaking machines	Black-Clawson Co.	2,870,691-2	"
Paper-coating machine	Black-Clawson Co.	2,870,738	"
Cartons	John F. Currivan	2,870,949	"
Carton	Bloomer Bros. Co.	2,870,950	"
Double-walled box	Diamond Gardner Corp.	2,870,951	"
Carton	Diamond Gardner Corp.	2,870,952	"
Bag	Bemis Bro. Bag Co.	2,870,955	"
Jordan plug body	John W. Bolton & Sons Inc.	2,871,769	2/3/59
Papermaking machine	Jesse A. Jackson	2,871,770	"
Production of gusseted bags	Milprint Inc.	2,871,771	"
Display carton	Paul W. Lindberg	2,872,031	"
Paper board wrapper having strengthened edges	Mead-Atlanta Paper Co.	2,872,036	"
Egg-packing flats	Central Fibre Products Co.	2,872,062	"
Molded pulp set-up box	Chaplin Corp.	2,872,093	"
Portable insulated container	Robert K. Adams	2,872,095	"
Collapsible cellular carton	Alfords Cartons	2,872,096	"
Re-closable containers	Paul J. Graybill	2,872,097	"
Combination envelope	Gaw-O'Hara envelope Co.	2,872,098	"
Envelopes	Gerard Prial	2,872,099	"
Envelope	Harry B. Coffin	2,872,100	"
Method of coating a felted-fibrous mat	Weyerhauser Timber Co.	2,872,337	"
Machine for erecting a carton	Badger Paper Mills Inc.	2,872,855	2/10/59
Container with cover lock	Paper Maid Inc.	2,873,057	"
One-piece hinged case	Harry Janson	2,873,058	"
Egg carton	Diamond Garden Corp.	2,873,059	"
Receptacle liner	Daniel O. Inman	2,873,060	"
Manufacture of egg cartons	Gummed Tapes (Pty.) Ltd.	2,873,654	2/17/59
Carton-locking mechanism	Valley Pattern & Mfg. Co	2,873,655	"
Hydraulically loaded feed rolls for corrugated paper stock	Samuel M. Langston Co.	2,873,968	"
Extraction of heat and SO_2 from sulfite waste liquor	Aktiebolaget Rosenblads Patenter	2,874,043	"
Multi-stage pulping process for high alpha-cellulose content	Hermann F. J. Wenzel	2,874,044	"
Coated paper products	Rohm & Haas Co.	2 874,066	"
Method of waterproofing paper	Petron Products Inc.	2,874,075	"
Method of treating fiber boards	Aktiebolaget Svenska Flaktfabriken	2,874,481	2/24/59
Creped paper with improved softness	Crown Zellerbach Corp.	2,874,618	"
Apparatus for heat sealing cartons	Sydney R. Phin	2,874,619	"
Apparatus for coating a travelling sheet	Beloit Iron Works	2,874,674	"
Pleating paper	Sorg Paper Co.	2,874,754	"
Wax-coated paper rolls	Kalamazoo Vegetable Parchment Co.	2,874,831	"
Can carrier	New Haven Board & Carton Co.	2,874,833	"
Can-carrying carton	Waldorf Paper Products Co.	2,874,869	"
Handle carton	Container Corp. of America	2,874,870	"
Liquid-tight container	Sealbright-Oswego Falls Corp.	2,874,888	"
Carton for packing fruits	Paperbox Corp.	2,874,889	"
Box	Milton C. Evanstein	2,874,890	"
Container	Growers Container Corp.	2,874,891	"
Papermaker's alum	American Cyanamid Co.	2,875,045	"
Coating composition for paper	Eastman Kodak Co.	2,875,164	"
Blank gluing apparatus	Diamond Gardner Corp.	2,875,726	3/3/59
Folding box	General Aniline & Film Corp.	2,875,936	"
Carton	Cantinental Paper Co.	2,875,937	"
Dispensing cartons for cigarette packages	Percy W. Bramhill	2,875,938	"
Fruit shipping crate	Allied Plastics Co.	2,875,939	"
Portable food and beverage holder	Lyman D. Dunn	2,875,940	"
Tray carton	Continental Can Co. Inc.	2,875,941	"
Corner construction for boxes	Owens-Illinois Glass Co.	2,875,942	"
Cartons	John G. Cooper	2,875,943	"
Block bottom multi-ply valve bag	Bowater Research & Development Co. Ltd.	2,875,944	"
Continuous manufacture of cellulose	Hans-Werner Meyer	2,876,098	"
Synthetic board	Abitibi Power & Paper Co Ltd.	2,876,153	"
Head box	Sandy Hill Iron & Brass Works	2,876,684	3/10/59
Folding-box blank crushing and gluing machine	Universal Corrugated Box Machinery Corp.	2,876,731	"
Wood wafer cutting machine	William R Matthews	2,876,811	"

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Liquid paper dye

A new liquid dye for paper, called Green MX Liquid, may be added to the water being fed into the preparation tank or directly to the mixing chest. With either addition, the dye is quickly and uniformly distributed throughout the fiber mass. There is no danger of color specks, caused by undissolved dyes.

Stock solutions of dye may be prepared in large quantities for either calender work or for continuous addition. Preliminary problems regarding solubility or dilution, prevalent in some types of powders, are eliminated. Cooking and solvent aids are not necessary. *American Cyanamid Co.*

Circle No. 11 on Readers' Service Card

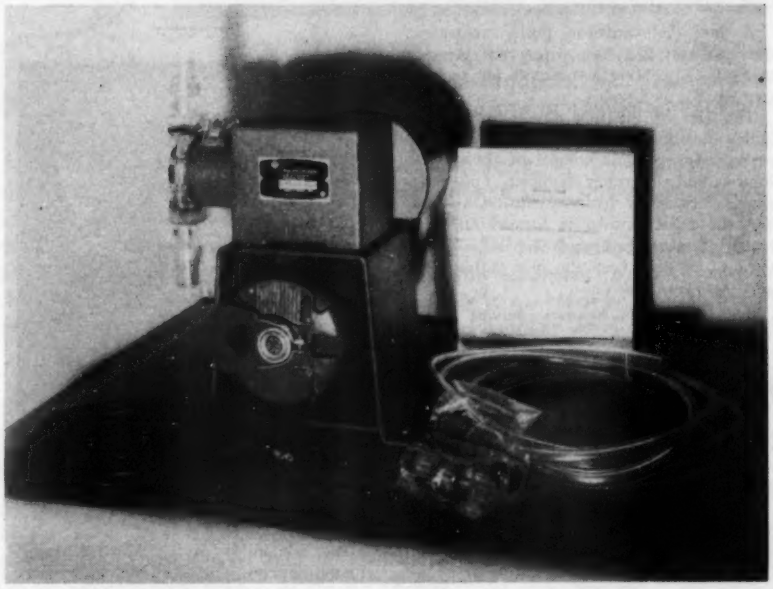
Reactivators

A new patented design that makes possible the economical construction of a reactivator solids-contact unit has been developed. Called Inverta-Truss, the new design provides support for all internal equipment without resorting to the conventional truss bridge.

Because it uses functional members, it requires much less steel than a conventional truss of comparable strength. By even distribution of the stress, the need for reinforcement at localized points is eliminated.

The Inverta-Truss will permit the economical construction of reactivators in excess of 200 ft. in diameter. Such units are said to be able to treat about 50,000 gpm. of water.

The reactivator is an up-flow, sludge-recirculating clarifier, and provides flocculation, coagulation, sedimentation and sludge removal in a single compartmented



Chemical proportioning pump

A new electrically driven, positive-displacement, chemical proportioning pump has been introduced. Known as Proportioneers Model-1210 Chem-O-Feeder, it features a corrosion-resistant, transparent plastic head, Hypalon diaphragm and check valves, and a straight-through flow design.

Efficient and compact, the pump uniformly proportions chemical solutions, acids, alkalies and process water in industry — wherever the precise and controlled feeding of chemicals is of utmost importance.

The new pump is available in three models, Simplex, Duplex and Triplex, for adjustable, wide-range proportioning up to 12, 24 and 36 gal. per hr. with discharge pressures up to 125 lbs. psi. *B. I. F. Industries Inc.*

Circle No. 12 on Readers' Service Card

Kalamazoo

WOOD TANKS

Built from best tank grade lumber. Backed by over 90 years' tank building experience. *Kalamazoo* can give you what you want. Free estimates and suggestions. Write today.

WOOD TANK DIVISION

Kalamazoo TANK and SILO COMPANY

1570 HARRISON ST., KALAMAZOO, MICHIGAN

WILLIAMS-GRAY COMPANY

221 North LaSalle Street
Chicago 1, Illinois

Serving the Paper Industry 1906

Paul Foster • Peter Talbot

Herb Fishburn • Wes Gallup • Bill French

Lindsay Wires
Knox Woolen Felts
Mount Vernon Dryer Felts
Carrier Rope, Splicing Tissues, Deckle Webbing, Apron Cloth, Wire Brushes

unit. It is used for clarification and softening of industrial water supplies, brine purification, treatment of industrial wastes, white-water recovery and many other special applications. *Graver Water Conditioning Co.*

Circle No. 13 on Readers' Service Card

Conveyor pulleys

A new belt-conveyor pulley increases conveyor belt life, has 25-per cent greater strength, is concentric to .030 in. and is free from crown welds.

The rim of the new Die Crown steel pulley is formed in a die by hydraulic pressure for accurate control of the crown contour and the pulley diameter. The company's method of hydro-expansion assures that the pulley crown is formed on true center. True-center crowns aid initial belt setting and help keep the belt centered at all times. *Link-Belt Co.*

Circle No. 14 on Readers' Service Card

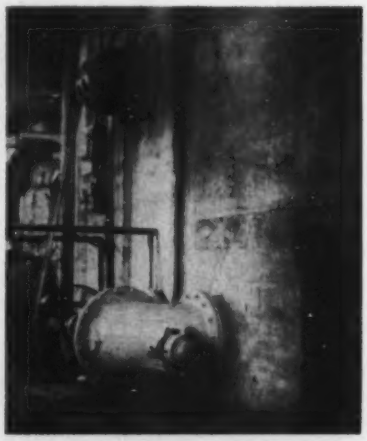
High-velocity stock cleaner

A free vortex-type, non-plugging, high-velocity separator for removing high and medium specific gravity rejects from slushed paper stock has been introduced.

Named the Liquid Cyclone because of the cyclonic movement of the stock as it undergoes separation treatment, it is entirely self-contained and requires no additional supporting members. The stock cleaner is totally enclosed and requires only minimum maintenance and attention.

Liquid Cyclones are available for either high- or low-pressure separation. Individual unit sizes are designed for capacities of 25 and 50 tons per day. Multiple units would be recommended for higher tonnage requirements. *Dilts Div., Black-Clawson Co.*

Circle No. 15 on Readers' Service Card



Chest agitator

The availability of the APMEW rapid-circulation chest agitators, for both horizontal and vertical chests, is announced. They feature thorough mixing and economy of operation.

The above picture shows an installation of a horizontal chest agitator on a concrete chest. The chest is equipped with a midfeather. The stock circulates through the agitator; then longitudinally through one half of the chest, around the end of the midfeather and back longitudinally through the other half of the chest to the agitator. Complete movement of the stock in the chest is made every two minutes. Extra good mixing and agitation is maintained with 3.8 hp. *American Paper Machinery & Engineering Works Inc.*

Circle No. 16 on Readers' Service Card

High-consistency pulper

A new high-consistency pulper has been introduced. It accomplishes complete and uniform pulping at 6 to 12 per cent consistency in average cycles from 20 to 30 min., depending upon the type of furnish and the degree of defibering required.

The pulper features a tub of new design which uses minimum floor space. It contains four lobe-shaped sections with sides tapering inward toward the top.

The high-consistency pulpers are made in five sizes. They range from 1000- to 5000-lb. units, with a capacity range of 9 to 180 tons per day, at standard rating of 6 per cent consistency. They are available in stainless steel, carbon steel and tile. *Emerson Mfg. Co. Div., John W. Bolton & Sons Inc.*

Circle No. 17 on Readers' Service Card

Loading and feeding equipment

The availability of a new line of specially designed loading and feeding equipment to meet widely varying requirements is announced. Based on standard component parts, each item is modified to suit the specific job by the addition of special control and operating equipment, or alternate design choices. *Bucket Elevator Co.*

Circle No. 18 on Readers' Service Card

Adjustable speed drives

The introduction of an entirely new series of packaged adjustable speed drives has been announced. Tradenamed Polydyne, the drives are available in a wide range of outputs and speed ratios, all operating on the proven principle of V-belt-connected, adjustable pitch pulleys.

Belt replacement is simplified by a design which assures adequate internal clearances. In addition, controls are undisturbed and belt tensioning is automatic and immediate. These features combine to make the belt-changing operation quick and easy. *General Electric Co.*

Circle No. 19 on Readers' Service Card

New magnesium hydroxide

Magnesium hydroxide is now available in 60-per cent concentrations as a result of improved manufacturing processes. This is said to be the first time a concentration this

precision CORE CUTTERS
to meet ALL requirements

up to 18 in. I. D. and lengths to 220 in.

Whether your requirements call for small or large I.D., short or long lengths, automatic, semi-automatic or manual . . . John Dusenbery Co., Inc. can supply every type of core cutter to do your job quickly, efficiently and economically. Ragged edge cores become a thing of the past when you use these modern, up-to-date core cutters. You get smooth, uniform cuts to precise lengths as desired, with complete safety for the operator.

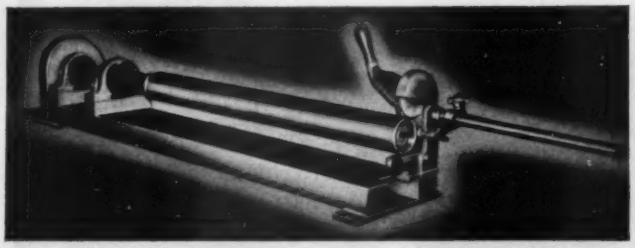
With our exclusive sales representation* for the Textile Paper Products, Inc. line of Core Cutters, you have a strong combination offering these two important things:

1. The advantage of Dusenbery "know-how" on their series of small converter type core cutters.

2. The versatility of the Textile Paper Products line, backed by the extensive research and development on their large Heavy-Duty Automatic Core Cutters and smaller semi-automatic high production cutters.

This enables us to supply every type of core cutter and to give technical advice when needed. Illustrated are three of the many models available.

*UNITED STATES AND CANADA

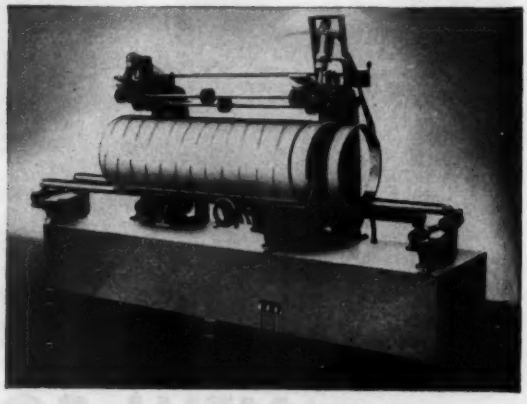


DUSENBERY MODEL 765

Simple operation . . . low cost. Without outboard support cuts can be made to the center of a 90" long core, permitting 1/8" to 45" long cores to be made. For longer cuts, an outboard support bracket can be supplied. No special electrical connections are required; just plug into any 110V light or wall socket.

SPECIFICATIONS

- overall length — 72"
- overall width — 20"
- overall height — 18"
- core I.D. range 3" to 6"
- approx. shipping weight—250 lbs.
- motor specifications: 1/4 hp, 110V, single phase



TEXTILE PAPER PRODUCTS MODEL CR-90

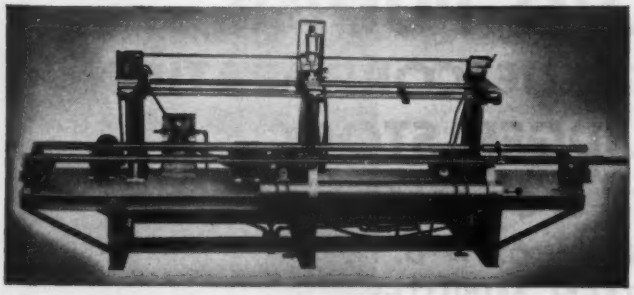
This machine handles cores up to 150" in length with recuts from 1/8" to 75"

SPECIFICATIONS

- overall length—108"
- overall width—30"
- overall height—66"
- core I.D. range—3" to 18"
- nec. air press.—60 lbs.
- approx. shipping weight—3000 lbs.
- saw blade—8", carbide tipped, core type

Motor specifications: Main Drive Motor, 2 hp, 3600 RPM; Rider Roll Drive Motor, 1/8 hp, 36 RPM output; Positioning Motor, 1/4 hp reductor, 68 RPM output.

Circle No. 21 on Readers' Service Card



TEXTILE PAPER PRODUCTS MODEL CR-120

The machine that does it all!
Handles cores to 220" with recuts from 1/8" to 110"

SPECIFICATIONS

- overall length—168"
- overall width—30"
- overall height—66"
- nec. air press.—60 lbs.
- core I.D. range—3" to 18"
- approx. shipping weight—4000 lbs.
- saw blade—8", carbide tipped, core type

Motor specifications: Main Drive Motor, 3 hp, 3600 RPM; Rider Roll Drive Motor, 1/8 hp, 36 RPM output; Positioning Motor, 1/4 hp reductor, 68 RPM output — All motors 220, 440, 3 phase.

Dusenbery

ENGINEERED CONVERTING EQUIPMENT

JOHN DUSENBERY CO., INC. 290 GROVE AVE., VERONA, N. J.

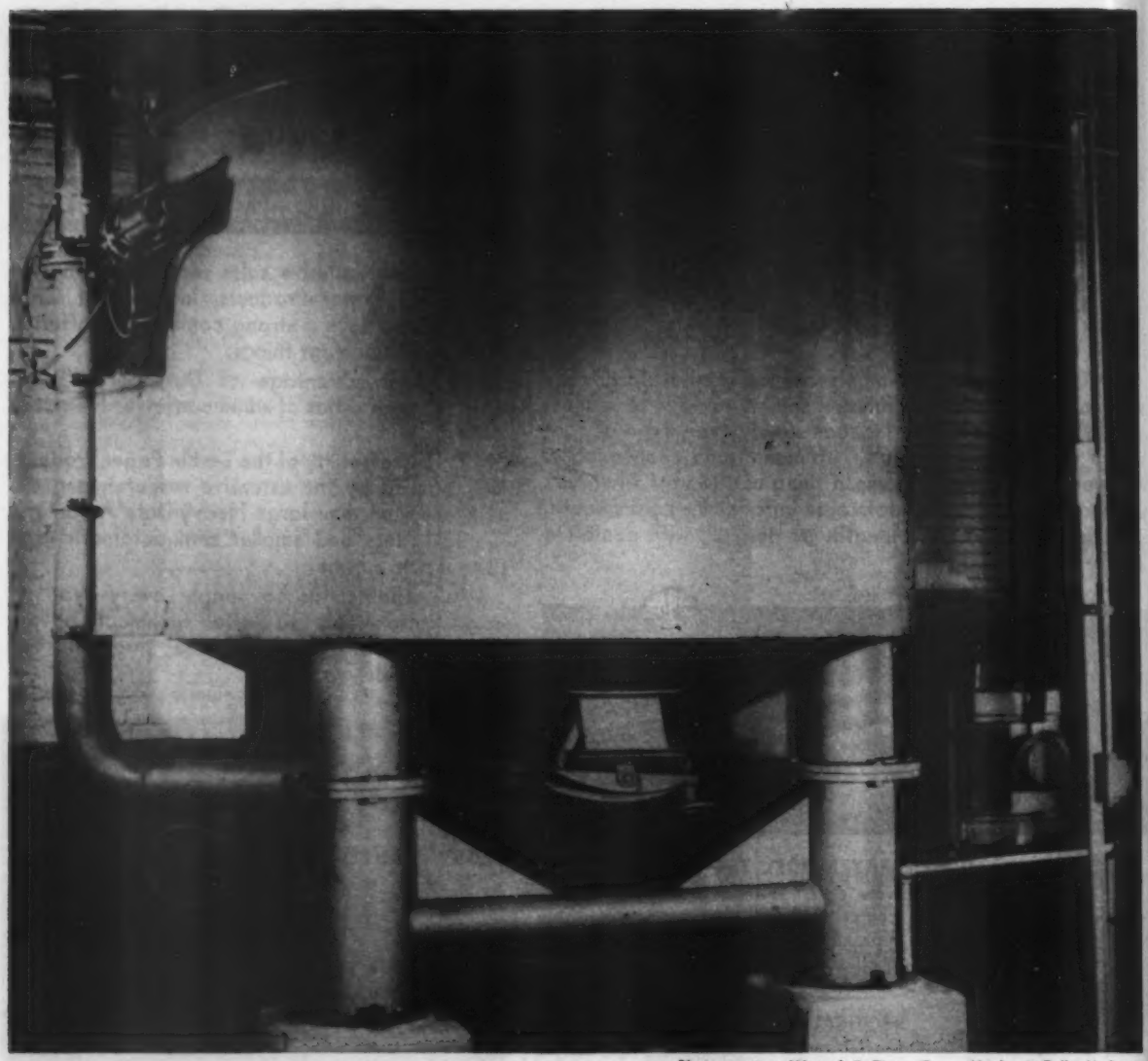


Photo courtesy Waterfalls Tissue Corp., Mechanic Falls, Maine

NEW SOLVO PULPER
AT WATERFALLS TISSUE CORPORATION
PULPING LEDGER STOCK

QUALITY — SPOT FREE
CONSISTENCY — 6.5% B. D.
TIME — FIFTEEN MINUTES

SIMILAR PERFORMANCES ARE OBTAINED ON WET STRENGTH TISSUE BROKE, HARD WHITE SHAVINGS AND TABULATING CARDS

IMPROVED MACHINERY INC.
NASHUA, NEW HAMPSHIRE

In Canada, Sherbrooke Machineries Ltd., Sherbrooke, Quebec

New Products . . .

high, containing a pumpable consistency, has been commercially produced.

Magnesium hydroxide, a chemical intermediate, is primarily used as a raw material for magnesium base pulping in the paper industry, including the new magnefite process.

A net effect of the higher concentrated material will be a lower delivery cost to customers who will receive less water and approximately 25 per cent more useable solids. *Dow Chemical Co.*

Circle No. 20 on Readers' Service Card

Precision core cutters

A complete line of precision core cutters, to meet all requirements up to 18 in. I. D. and lengths to 220 in. is now available. For information on the company's Dusenbery Model 765, Textile Paper Products Model CR-120 and Textile Paper Products Model CR-90, turn to page 427. *John Dusenbery Co. Inc.*

Circle No. 21 on Readers' Service Card

Pulp bale stackers

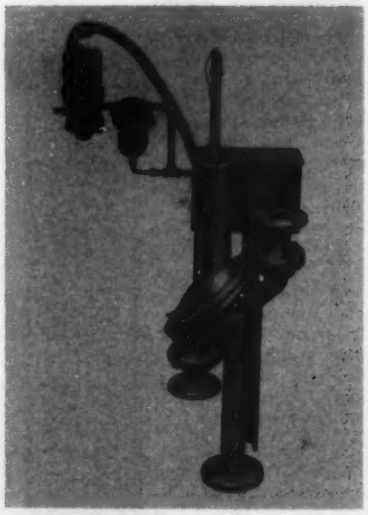
The availability of three pulp bale stackers is announced.

The automatic Lamb elevator stacker shown in photo) receives bales (one at a time) as fast as they come down the finishing line, elevates and holds them until a stack of predetermined number has been accumulated and then, automatically discharges the stack for fork truck pick-up, to be carried to storage or carloading areas.

The Lowerator stacker lowers the stack to a level below and automatically discharges it for pick-up.

The Monorail stacker is a specially developed unit adaptable to multiple stacking on skids for ship or barge loading. It can also pile single stacks of bales for warehousing or shipment. *Lamb-Grays Harbor Co. Inc.*

Circle No. 22 on Readers' Service Card



Controlled-volume pump

A controlled-volume pump for hard-to-handle slurries or solutions is in production. It uses the design principles of the Oliver diaphragm slurry pump.

On the new pump, the pump chamber is inclined to eliminate entrained air from the body automatically. There are double ball check assemblies for obtaining the highest slurry metering accuracy.

According to the company, the O. D. S. controlled volume pump is capable of handling abrasive slurries containing up to 60 per cent solids and delivering them at pressures up to 90 lbs. psi. Gentle diaphragm action, which minimizes particle degradation and the ability to pump against high discharge pressure, makes the unit effective for handling feeds to all types of filters. *Milton Roy Co.*

Circle No. 23 on Readers' Service Card

Napkin folder

A jumbo-size napkin folder has been introduced. It produces 24-in. paper medical and dental bibs. The machine operates from three parent rolls with web widths up to 24 in. and provides napkin cut-offs up to 24 in. It processes 3-ply facial tissue stock and embosses each paper web in separate embossers for each of the three delivery decks of the folder. Delivery can be in any of the standard packaging folds desired.

Production is at the rate of 500 finished bibs per min., per folder deck; or a total

NOW—CHECK ACCURACY WHILE YOU CHECK MOISTURE!

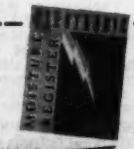
New Electronic Moisture Registers have first "built-in standard" in a 3-second, portable moisture tester.

NOW DIAL ACCURACY IS ASSURED, even under the extremes of production-line use. With *self-checking standard,* Moisture Register's new Model 5's are checked and adjusted for calibration accuracy right on the job—by any untrained operator. He simply fits electrode to standard. Then with new trimmer he sets dial for perfect alignment. Gives calibration adjustment *in the field.* You get practical accuracy down to 0% . . . 3-second spot tests for moisture wherever your product may be. Portable, light weight, battery operated, new rugged construction with miniature tube. Factory-set to your needs.

For faster testing of—

- Paper Stock
- Paperboard
- Insulation boards
- Paper Bags
- Plastics

SEND FOR NEW TECHNICAL DATA and information on 2-week free trial.



ELECTRONIC MOISTURE REGISTER Instruments

Moisture Register Company, Dept. PI
P. O. Box 910, Alhambra, California
Please send data on new Model 5's.

We are testing _____
in moisture range from ____% to ____%
Firm _____
By _____ Title _____
Address _____
City _____ State _____

Hop On The Jenkins' METLKOR Bandwagon

You'll have plenty of company, for Paper Mill men everywhere are using Jenkins' METLKOR brushes for every paper brushing application. They are built better, to perform better, and last longer.

Jenkins' METLKOR Paper Polishing Brush.

JENKINS' PAPER MILL BRUSHES

Blanket washer • Coating • Conveyor • Dampening • Dusting • Feed • Felt cleaning • Flocking • Fourdrinier wire cleaning • Nutmeg roll cover • Offset powder removal • Paint brush • Polishing • Scrap removal • Sieve • Spray • Static elimination • Void detector • Web cleaning.

BRUSHES FOR PRINTERS: Cylinder hold down • Dusting • Nutmeg roll cover • Offset dampener roll cleaning • Offset powder removal.

Specify Jenkins' METLKOR
the original . . . the best *Metal-Core* brush

METLKOR®
CYLINDER BRUSHES
and **LIFEWOOD®** WOOD BACKED BRUSHES

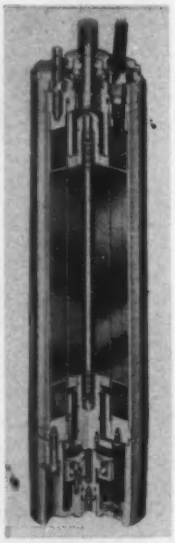
M. W. JENKINS' SONS, INC.
Serving Industry for Over 80 Years
742 Pompton Ave., Cedar Grove
Essex County, N. J. • CEnter 9-5150

New Products . . .

of 1500 napkin bibs per min., when running three decks. Fully automatic in operation, the machine tab counts and delivers bibs folded and cut square for equalized packaging and complete customer satisfaction. *Hudson Sharp Machine Co., subsidiary of Food Machinery & Chemical Corp.*

Circle No. 24 on Readers' Service Card

Submersible motor

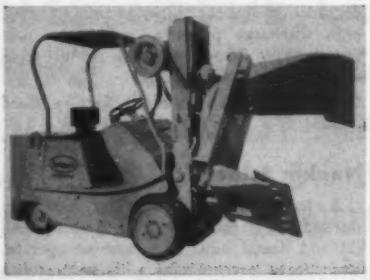


A new 4-in. submersible motor has been designed to drive deep-well turbine pumps in domestic and industrial water-supply applications. The motor provides the highest horsepower capacity now available in a motor of that diameter. Ratings offered in single-phase construction are from 1½ to 3 hp. In three-phase construction, ratings extend from 1½ to 7½ hp. at 3550 rpm.

Greater horsepower capacity for its size is achieved by using an outside-wound stator. This construction permits more effective use of copper and iron for higher efficiency and torques. The motor stator is protected by a high dielectric insulation system, encapsulation in a chemically inert plastisol and by sealing in stainless steel.

For complete corrosion resistance, bearing brackets are cast iron, the thrust bearing is stainless steel and all other exposed parts are of stainless steel, brass or neoprene construction. *Louis Allis Co.*

Circle No. 25 on Readers' Service Card



Industrial truck

A new heavy-duty industrial truck, called the GLF-80 Dynamotive, has been introduced. According to the company, it simplifies the task of loading and unloading 5200-lb., 60-in. diameter paper rolls from the narrow interiors of railroad boxcars.

Equipped with a revolving paper-roll attachment, the new model provides high operating efficiency, low cost operation and maximum efficiency. A special rounded counterweight provides a truck which is 8 in. shorter than a standard unit. *Automatic Transportation Co., Div. of Yale & Towne Mfg. Co.*

Circle No. 26 on Readers' Service Card

Fittings

The availability of new Speed-Rail and Nu-Rail fittings is announced. They are made of aluminum alloy and slip onto pipe without use of any tools. Fastening is accomplished by means of recessed set screws tightened with a simple hex wrench.

Since one length of pipe either bypasses another, or else goes right through the fitting, there is much less need for cutting pipe. Any installation can be disassembled easily, and both the pipe and fittings can be re-used.

Speed-Rail fittings are those through which the pipe passes. Nu-Rail fittings utilize the off-set design. Both types have the slip-on and set-screw features. According to the company, these fittings have been developed to cut installation time by 60 to 80 per cent and save 30 per cent in overall cost. *Hollaender Mfg. Co.*

Circle No. 27 on Readers' Service Card

Nuclear thickness gauge

A new ultra-sensitive nuclear thickness gauge, designated as Model 42,000, has been developed.

It measures: paper thickness in fourdrinier or cylinder processes to 2 millionths in. without contacting paper; thickness of protective coverings, impregnations and coatings (chemical, ink, paint, paper, wax, etc.) to within 0.01 per cent of total material thickness; and changes of .005 mg. per sq. cm. in basic unit weight of paper, cardboard, laminated products, etc.

Use of this gauge in conjunction with the company's automatic controls provides automatic uniform-product consistency. *Radiation counter Laboratories Inc.*

Circle No. 28 on Readers' Service Card

Pipe fitting

The development of three new components have been announced for Unitrace piping.

The new fittings include 90° elbows, adapter flanges, and new cast flanges. The new elbows speed installation of Unitrace in areas where a number of right-angle turns are required. The adapter flange makes joining possible between Unitrace and heated piping systems employing jacketed valves and fittings. Simple and efficient joining of Unitrace sections is now achieved with the new flange cast in alloy 356-T7. *Aluminum Co. of America.*

Circle No. 29 on Readers' Service Card

Power transmission units

Two new large-size gear speed reducers are being offered that are said to be the

largest standard units ever produced. Known as Philadelphia In-Line drives, these new power transmission units are rated up to 200 hp. and feature high overall efficiencies of 94 to 97 percent, depending upon the number of reductions required.

Double, triple and quadruple reductions are available in AGMA ratios of up to 440 to 1. Right-angle, spiral-bevel attachments are available for mounting in any of eight drive positions at 45° increments.

Maximum durability and strength are built into each of these new gear speed reducers. Final stage helical gearing is carburized and hardened. Gear teeth are precision ground, giving important advantages in increased load-carrying capacity, reduced vibration and noise, longer life and space savings. *Philadelphia Gear Corp.*

Circle No. 30 on Readers' Service Card

Two-volume pump

A new two-volume pump, requiring only a single-pressure setting for both unloading and maximum pressure has been announced. The new pump (designated as Type 33) prevents excessive heat generation and wasted horse power by automatically maintaining system pressure with a small volume pump while a fixed differential, between the relief-valve setting and the unloading valve, allows a return of large-volume pump capacity to the resevoir at negligible pressure.

The unloading response of the new single adjustment combination pump is three times faster than the previous two-adjustment models. Pressure recovery is said to be exceptional and should improve the hydraulic circuit of many machine designs, especially those requiring long runs of tubing or flexible-fluid conduit.

Type-33 combination pump is available with either foot or flange mountings. *Vickers Inc. Div. of Sperry Rand Corp.*

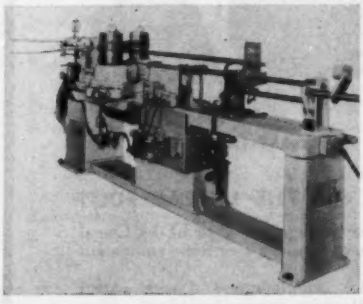
Circle No. 31 on Readers' Service Card

Mobile electric cranes

Two new mobile electric cranes, which can set their own outriggers and be ready to lift capacity loads within 30 sec. have been announced. Known as the Series R-30 and R-45 cranes, they have capacities of 30 and 45 tons respectively. All operating functions of both are electrically powered.

Smooth and exacting control of capacity loads is achieved through variable speed regulation of DC motors which power the hook line and boom swing. Added load-handling accuracy is provided by powered down-travel of the hook line and positive 360° power control of the boom swing. *R. G. Le Tourneau Inc.*

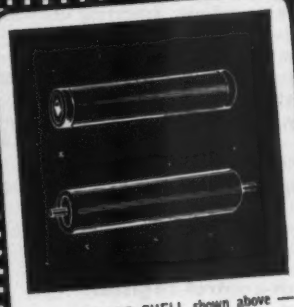
Circle No. 32 on Readers' Service Card



Tube winder

A new fully automatic, spiral tube winding machine with a hydraulically operated integral cut-off has been announced. It is designed to wind and cut roll cores, can bodies, protective sleeves, etc.

Called Model ATM, it is reported to produce tubes up to 20 ft. in length at speeds up to 120 fpm. The tube winder is exceptionally sturdy with a number of design features that assure accurate and clean square cuts. For most purposes, finished tubes can be produced on the machine, thus



The CAP WELD SHELL shown above — is made with square metal tube extending through the entire length of cylinder.
The MACHINE ROLL shown below Cap Weld Shell — is made from glued or solid stock, with journal through entire length, or gudgeons in the ends.

WOODEN
SHELLS • ROLLS • CORES
for the paper industry
OTHER OPTIONAL TYPES
• CAPPED END SHELLS
• CAPPED SQUARE SHELLS
• LAG ROLLS

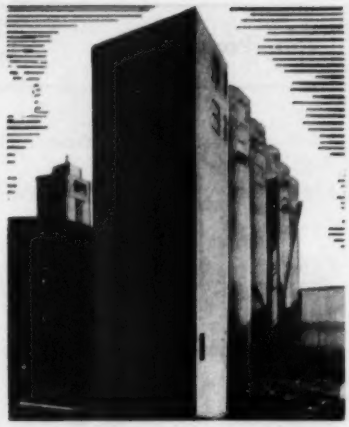
★

Supplied in Standard Diameters; other Diameters to 16" and Lengths to 11' on special order

★

SEND FOR LITERATURE

CYLINDER MFG. CO.
2 MAITLAND AVE., HAWTHORNE, N. J.
ESTABLISHED 1916



Save Man Hours

Equip Your Digester House with a

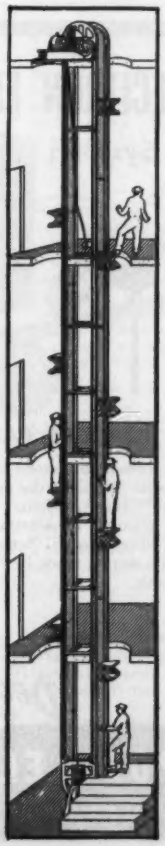
HUMPHREY

Employee's Manlift

ELEVATOR

Eliminate stair climbing — save time — reduce employee fatigue. The endless belt provides continuous up and down transportation to and from sampling and operating floors.

Easy and safe to operate with ready-at-hand stop and go controls and the exclusive Humphrey Safety Features.



Can be Installed in any Multi-Floor Building

Send us your requirements . . . we'll furnish complete information and prices.

HUMPHREY ELEVATOR COMPANY

Inc.

345 1st Ave. N.W.

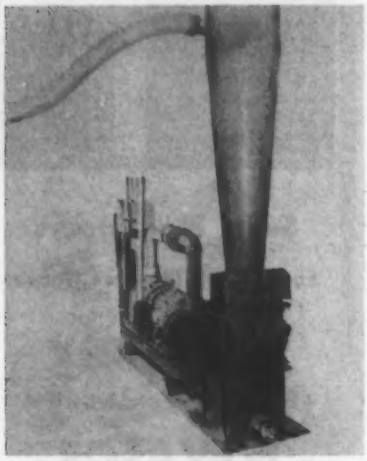
Faribault, Minnesota

Humphrey is the original Manlift Elevator, made continuously since 1887.

New Products . . .

eliminating the need for recutting. *Dietz Machine Works.*

Circle No. 33 on Readers' Service Card



Package pneumatic system

A new 40-hp., combination negative-positive pressure conveying system is now available. Called Pneu-Pac 40, it offers 100-per cent capacity increase over previous models with only a 50-per cent initial cost increase.

Pneu-Pac 40 is a complete package unit consisting of an inlet nozzle; flexible hose; long-cone products collector; rotary-feeder valve with motor and drive; two rotary positive-displacement blowers; a 40-hp., 1750-rpm. motor; kinetic transition with velocity trap; compact blow-through, flat-type manifold; and a standard in-line filter.

Although its capacity is greater than that of the 25-hp. Pneu-Pac, the new unit is designed to operate with the same line size, enabling the operator to use the same easy-to-handle unloading hose and nozzle with the greatest efficiency and the least fatigue.

It is 10½ ft. high, 13⅛ ft. long and 2-1/3 ft wide. The capacity of Pneu-Pac 40 is listed as 10 to 25 tons per hr. for soft feed ingredients and 15 to 20 tons per hr. on bulk whole grains or similar free-flowing materials. *Sprout, Waldron & Co. Inc.*

Circle No. 34 on Readers' Service Card

Ball valve and heavy-duty operator

The development of a new Double-Seal ball valve and heavy-duty operator, for use in digester blow-down installations in pulp and paper mill processing, has been announced.

The new valves are said to eliminate the need for a steam-tracer line and have proved completely successful in extensive test operations. *Jamesbury Corp.*

Circle No. 35 on Readers' Service Card

Chemical metering pump

A new chemical metering, controlled-volume pump for metering clear and corrosive liquids to chemical processes has been offered.

The new Model-CM delivers maximum capacities to 28 gph. in the simplex design and double that gallonage in the duplex design (two liquid ends with a common motor and base). It is constructed to handle pressures up to 1100 psi.

Typical applications in the papermaking industry are metering of glues, dyes, and wet-strength resins; and for the chemical-processing industry (metering of corrosive liquids against a head).

The pump is said to be simply constructed for easy operation and maintenance. Plungers are interchangeable within the pump frame and are easily converted in the field from simplex to duplex capacity. *Milton Roy Co.*

Circle No. 36 on Readers' Service Card

Batch-control register

A new batch-control register, designed to provide accurate flow-measurement wherever quantitative liquid controls are required, is being offered. Called the Sparling Totalizer Type-252, it may incorporate a limit switch to activate an alarm signal or other controls upon completion of the batch.

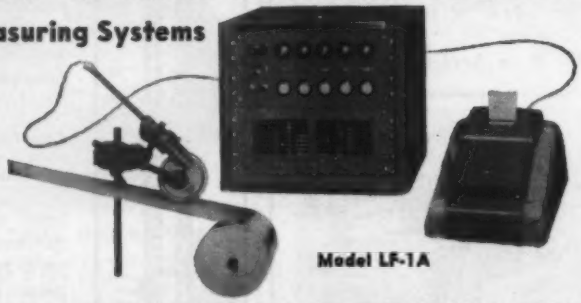
The Totalizer mounts on any Sparling main-line meter. In operation, a pointer on the 4-in. dial is manually set to the desired amount. As the flow passes through the meter, the hand returns to zero indicating at all points the quantity still to run.

Scale maximums are 10, 15, 20, 30, 40, 50 or 75, with additional ciphers as required. The accumulated total is shown on a 6-digit, straight-reading totalizer. An all-metal case with a locking hasp permits outdoor installation and protects against moisture and tampering. *Sparling Meter Co.*

Circle No. 37 on Readers' Service Card

POST DECITRON ELECTRONIC PRODUCTS

Measuring Systems



Model LF-1A

NOW . . . MEASURE PAPER BY THE LINEAL FOOT

Now! . . . a permanent record of lineal footage. The Post LF-1A Lineal Footage System combines the accuracy of proven electronic equipment with a visual "Clary" readout.

Ideal for accurate measurement for manufacturers of wire, paper, textiles and sheet metals. Sensing elements can be furnished so that measurements can be made in 1/16ths of an inch, 1/8ths, 1/4's or in full inch increments.

Write for literature.

Decitron

POST ELECTRONICS

Division of Post Machinery Co. | 161 Elliott St., Beverly, Mass.

NEW LITERATURE

Books

LABORATORIUMSTECHNIK (Laboratory Techniques) is the title of Volume 31 of the DECHEMA MONOGRAPHS. Published by Verlag Chemie GmbH, Weinheim/Bergstrasse, West Germany. Pages: 297. Price: DM 32.80 (DM 26.25 to DECHEMA members).

This volume contains 25 papers on Laboratory technique themes which were discussed at lectures delivered at the European Congress of Chemical Engineering in 1958 and at the 1958 ACHEMA Congress.

In certain cases, the published text represents an amplified version of original lectures due to the inclusion of numerous illustrations and diagrams relating to interesting new developments in the various fields of laboratory techniques—balances, pH measurement and titration, polarography, electrophoresis and chromatography, high-vacuum distillation, photometry and viscometry, centrifugation, etc.

RESINS, RUBBERS, PLASTICS YEARBOOK (1958). Edited by H. Mark, E. S. Proskauer and V. J. Frilette. Issued with the cooperation of the Institute of Polymer Research, Polytechnic Institute of Brooklyn. Published by Interscience Publishers Inc., 250 Fifth Ave., New York 1.

This new convenient-size edition is said to provide the essential literature on resins, rubbers and plastics for 1958. It consists of full abstracts which originally appeared monthly in loose-leaf form. Beginning in 1954, these successive yearbooks reportedly cover the entire field of resins, rubbers and plastics.

Every original contribution in the field (appearing in domestic and foreign journals) is represented by a full abstract; and in almost all cases, the original journal paper need not be consulted, add the publishers.

Booklets

PULPWOOD STATISTICAL REVIEW. The first supplement (May 1959) to the Pulpwood Statistical Review, published in May 1958, by the American Pulpwood Association, is now available. It covers data on pulpwood receipts, consumption and inventories for 1958. Most of this detailed information is not available in publications from the Bureau of the Census, claims APA. Other supplements to the original review, covering similar data for subsequent years, will be issued as soon as possible after the first of each year. Copies of the first supplement may be obtained by writing to the American Pulpwood Association, 220 E. 42nd Street, New York 17. Price: $1.00 per copy.

ACCIDENT FACTS is the title of the 1959 edition of the National Safety Council's statistical yearbook. It contains facts and figures on all types of accidents, such as home, traffic, industrial, public, farm and school. Several sections of the publication are devoted to industrial accidents and provide a comprehensive background for an industrial safety program. Included is a list of accident rates by major industrial groups, accident trends, the part of the body most often injured in accidents and off-the-job accident problems. This 96-page booklet also furnishes ideas and facts for preparing speeches, articles, reports and planning safety campaigns. For further information and for quantity prices, write to National Safety Council, 425 N. Michigan Ave., Chicago 11.

USDA Reports

RESEARCH NOTES. Here are three Research Notes now available from the Southeastern Forest Experiment Station of the U. S. Department of Agriculture.

No. 125—Site Index Curves For Upland Oak in The Southeast.

No. 126—International ¼-Inch Board Foot Volume Tables For Old-Field Slash Pine Plantations in The Middle Coastal Plain of Georgia.

No. 127—Site Index Curves For Old-Field Slash Pine Plantations.

For copies of these publications, write to Director, Southeastern Forest Experiment Station, Asheville, N. C.

TECHNICAL NOTES. Here are five Technical Notes now available from the Lake States Forest Experiment Station, U. S. Department of Agriculture.

No. 554—Forest Area in Wisconsin Counties.

No. 555—Further Observations on Seed Sacrification Show Benefits to Northern Red Oak Were Temporary.

No. 556—Trampling by Livestock Drastically Reduces Infiltration Rate of Soil in Oak and Pine Woods in Southwestern Wisconsin.

No. 557—The Effect of Time and Carbonizing Temperatures on Quality of Charcoal From a Cinder-Concrete Block Kiln.

No. 558—Lake States Pulpwood Production and Imports Decline in 1958.

Write to M. B. Dickerman, Director, Lake States Forest Experiment Station, U. S. Department of Agriculture, St. Paul 1, Minn., for copies of these publications.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Control valves

DeZurik Corp. has released a new 19-page bulletin, known as Bulletin 150, which describes its complete line of control valves. The publication lists valve bodies and actuators, as well as the accessory line available for DeZurik control valves. Valve sizing data is also included. A complete description of the DeZurik Eccentric Principle is diagramed and primary advantages of the valves are listed.

Circle No. 38 on Readers' Service Card

Pulping units

Morden Machine Co. has issued revised copies of two catalog pages, dated 5/5/59. These pages include revised detail of the company's Model C Slush-Maker with set screws for holding the pillow blocks in transverse alignment, as well as, additional information on pulping times for various materials. There have been some changes in terminology.

Circle No. 39 on Readers' Service Card

Dumpers

Conveyors & Dumpers Inc. has released a new highly illustrated bulletin on its line of CESCO dumpers—barrels, drums, boxes, bags and trucks. The bulletin discusses the outstanding features of the company's dumpers and their various applications and specifications with the help of charts and diagrams. Also included is a partial list of users and a selection chart for standard dumpers.

Circle No. 40 on Readers' Service Card

Submersible pumps

Layne & Bowler Inc. has released a new informative bulletin entitled Submersible Pumps. The bulletin contains detailed cross section drawings and colored illustrations of the varied uses and applications of the company's submersible pumps. The applications covered include: plant water systems, irrigation, reservoir pumping and municipal primary water supply.

Circle No. 41 on Readers' Service Card

Feedwater heaters

Stickle Steam Specialties Co. is offering a new bulletin featuring its line of feedwater heaters with internal vent condenser. The two-page bulletin shows internal views of both vertical and horizontal storage models.

Circle No. 42 on Readers' Service Card

Continuous boiler blowoff equipment

Cochrane Corp. has published a revised bulletin on how industrial plants can lower both

PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

New Literature . . .

labor and operating costs by using continuous boiler blowoff systems rather than intermittent manual blowoff systems. The bulletin gives a simplified method with quick-reference charts to enable boiler users to estimate potential heat savings for various continuous blowoff arrangements. Such systems as simple heat exchangers or flash tanks, flash condensers and heat exchangers are discussed and illustrated.

Circle No. 43 on Readers' Service Card

Rubber-covered rolls

Ames American Co. announces the availability of its six-page brochure which discusses its various types of rubber-covered rolls for use on papermaking machines. The roles described are Chem-Lastic, Granolastic, Skinlastic, Flintlastic, Tensilastic, Co-Lastic, Siz-Lastic, Skinlastic Lumpbreaker and embossing rolls. The brochure also mentions the dynamic balancing service provided by the company.

Circle No. 44 on Readers' Service Card

Multi-cylinder board forming machines

Sandy Hill Iron & Brass Works announces a new 35-page catalog section, featuring a multi-cylinder machine, used mainly for manufacturing paperboards in continuous-web plies. Also offered are other cylinder-type papermaking machines, where paper is plied on a making roll and dried on separate sheets in air dryers. This brochure also includes some basic machine designs on presses, dryers, calenders, reels and other special equipment.

Circle No. 45 on Readers' Service Card

Bucket elevators

Bucket Elevator Co.'s most recent literature describes the new Model G series conventional bucket elevator, available with either belt or chain-mounted buckets. The literature contains complete details on its mechanical features and materials.

Circle No. 46 on Readers' Service Card

Polyethylene resins

Eastman Chemical Products Inc., subsidiary of Eastman Kodak Co., has published a new brochure that discusses the various uses of Epolene C and Epolene N, the non-emulsifiable and low-molecular weight polyethylene resins. The 22-page brochure includes viscosity and cloud point graphs and tables.

Circle No. 47 on Readers' Service Card

Concrete floors

Master Builders Co. has published a new 24-page bulletin that discusses the company's Masterplate "iron clad" concrete floors. Major features sought in the design of any industrial floors subject to heavy use, wear and corrosion resistance, etc. are discussed. Complete photos, diagrams and detailed explanations cover the methods of installation and actual facilities where Masterplate concrete floors are now in service.

Circle No. 48 on Readers' Service Card

Speed-drive equipment

Dynamatic Division, Eaton Mfg. Co. has released a comprehensive illustrated bulletin that describes its complete line of adjustable speed-drive equipment for industrial application. Equipment mentioned are eddycurrent couplings, drives, brakes, dynamometers and magnetic friction clutches and brakes.

Circle No. 49 on Readers' Service Card

Pumps

Ingersoll-Rand Co. announces the publication of a new 24-page bulletin that describes in full detail its line of pumps built for the pulp and paper industries. The bulletin contains a table that matches each paper service with the seven models of pumps designed to handle that specific job. Each description points out different design features and is complete with cross-section and installation illustrations, as well as a listing of heads, capacities and discharge sizes.

Circle No. 50 on Readers' Service Card

Occupational-safety services

National Safety Council announces its 1959 catalog of occupational safety services. It gives descriptions and prices of publications and materials which can help industrial firms with their various safety responsibilities and problems. The materials are grouped by function—administrative, supervisor training, employee training, motor transportation. An alphabetical listing of all NSC safety films is also given.

Circle No. 51 on Readers' Service Card

Centrifugal and rotary pumps

Paris Products Div., Detroit Harvester Co. announces the availability of a new 72-page catalog describing and illustrating its Pioneer open-impeller centrifugal pumps and the Rollaway mechanical, positive-displacement rotary pumps. The catalog covers pumps designed for special conditions found in the pulp and paper industries.

Circle No. 52 on Readers' Service Card

Solids pump

Morris Machine Works is offering a new bulletin describing the capacities and ranges of its new CK solids pump which handle fluids containing random-size solids, highly abrasive materials and pulpy mixtures.

Circle No. 53 on Readers' Service Card

The Paper Industry
Professional and Business Services

J. E. SIRRINE COMPANY
ENGINEERS Since 1902
GREENVILLE, SOUTH CAROLINA

Design	Consultations
Paper & Pulp	Reports
Water & Waste	Appraisals
Steam & Hydro Power	Steam Utilization

EUROPEAN MARKET REPRESENTATIVE

Paper Bags Converter, disposing of a commercial organization, offices, warehouses and workshops situated in Eastern Belgium, looks for representation of converted articles, or collaboration with a U.S.A. converter, with an eye to the European Common Market.

The PAPER INDUSTRY
Box No. 686

CLASSIFIED ADVERTISING

WANTED

TOUR BOSS — for Cylinder Board Mill. Steady well paying with fringe benefits. Ideal climate. Send full qualifications and background. Miami Paper Board Mills, Inc., P. O. Box 48-197, International Airport, Miami 48, Florida.

RESEARCH OPPORTUNITY

Columbia Cellulose Company, Limited, has created a new position within its Research and Development Division. The Group Leader, Product Properties will be responsible for leadership of people who are mainly concerned with tailoring the pulp products to customer's processes.

A man with a Ph.D. is preferred, although applicants lacking this academic background will be considered if their other qualifications are strong. Research experience in Cellulose Acetate and/or Viscose is required. Applicants must have demonstrated ability in solving important technical problems.

Preference will be given to applicants in the age group 30-45 who have sound supervisory experience.

Please send full resumé to:

Industrial Relations Superintendent
Columbia Cellulose Company, Limited
P. O. Box 1000
Prince Rupert, B. C.

CHARLES P. RAYMOND SERVICE, Inc.

THE POSITION YOU WANT may be available right now. The demand for executives is increasing. Salaries are attractive. You are invited to send us your resume in confidence.

THE EXECUTIVE YOU NEED may be listed with us. Employers find our Service helpful and time saving.

Your phone call, wire or letter will bring prompt attention. LIberty 2-6547 — 294 Washington St. — Boston 8, Mass.

WANTED — Flat Face Cylinder Type Hog Grinder, Mitts & Merrill or similar, Write The Paper Industry, Box 686.

WANTED

Well established New England manufacturer of heavy equipment for the pulp and paper industry, needs a young sales engineer to be located in the lake states area. Should be graduate mechanical or chemical engineer, preferably with stock preparation background. Excellent salary. Adequate expense account. Car furnished. Send complete resume which will be kept confidential by our executives to Box 682, The Paper Industry.

WANTED

Two young mechanical engineering graduates are needed by a well known manufacturer of heavy machinery as resident sales engineers. Good salary, benefits and opportunities for advancement for ambitious young men. Fine living accommodations in a New England community in the heart of year-around recreational areas. Your resume will be kept confidential. Write to Box 683, The Paper Industry.

Eight Publications for Papermakers

Pulp and Paper, Volume 1 (Casey)	$18.00
Pulp and Paper, Volume II (Casey)	18.00
Paper and Paperboard Making (Williamson)	6.00
Technology of Paper Coating	2.00
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
Notes and Observations on Beaters	1.00
Trouble on the Paper Machine	.75

Mail your order with payment to:

The PAPER INDUSTRY

431 S. Dearborn Street, Chicago 5, Illinois

RESEARCH
NEVER STOPS AT
SINCLAIR
It helps you increase paper production with more efficient rolls and wirecloths
Precision Weaving is one result of SINCLAIR research. Our modern looms, operated by highly skilled personnel, are capable of weaving the very finest fourdrinier wires to the closest of tolerances. These two important elements are your assurance of fine wire for trouble-free service on your paper machines.
For Fast and Efficient Service, Write or Phone:
THE SINCLAIR COMPANY
65 APPLETON STREET • JEfferson 2-9488
HOLYOKE, MASSACHUSETTS

if it's done better with spray nozzles—
better
best
it will be done best with
SPRAYING SYSTEMS CO.
SPRAY NOZZLES
HERE'S WHY:
1. You have a complete choice of design types to give the exact spray characteristics required.
2. You have thousands of capacities to choose from . . . for more exact volume control.
3. You have a complete choice of materials for chemical compatibility.
Your inquiry is invited.
LIQUID
SPRAYING SYSTEMS CO.
3254 Randolph Street
Bellwood, Ill.
For complete spray nozzle information write for Catalog 24.

Allied Personalities

(Continued from page 417)

general manager. Phelps succeeds **Robert J. Jacobs,** who recently resigned to accept a postion with another firm.

Wesley P. Bauver, sales representative for Bauer Bros. Co. of Springfield, Ohio, is again serving the company's New England sales territory after more than a year of recuperating from injuries suffered in a plane crash in May 1958.

A new technical service group, to serve the paper industry, has been organized by Colton Chemical Co., a division of Air Reduction Co. Inc. This group will be responsible for developing new products for the paper industry, finding new uses for existing products and will conduct applications research on the use of Colton products for paper processing and finishing. **George W. Pixler** heads the group. Pixler, who recently joined Colton to help organize this activity, earlier assisted in organizing a similar group at Diamond Alkali Co.

The appointment of **Benny F. Howell** to serve the paper trade in the Southeastern market is announced by the sales department of Arnold Hoffman & Co. Inc., manufacturers of organic chemicals. The appointment, according to the company, is keyed to its expanding sales of defoamers and other specialties, developed especially for pulp and papermaking.

Harold Weiss has been appointed to the newly established position of manager of applications engineering in General Electric Co.'s Computer Dept. at Deer Valley Park, Phoenix, Ariz. In his new position, Weiss will be responsible for organizing and staffing an applications engineering group to assist deparmtent customers in applying electronic computers to industrial, scientific and business problems.

Organizational changes, designed for more effective handling of its expanding interests in coatings for the paper industry, are announced by Dow Chemical Co. **L. H. Silvernail** has been promoted to group manager in the company's Coating Technical Service, comprising four sections, including the Paper section which is primarily concerned with better additives and coatings to facilitate printing and saturation. **E. J. Heiser** is in active charge of the paper section. **Fred K. Quigley Jr.** has been advanced to the position of staff manager of coating materials. Formerly assistant manager of Coatings Technical Service since 1956, Quigley succeeds **E. K. Stilbert,** recently named a product group vice president of Dow Chemical International Ltd. of South Africa.

Frank S. Winship has been appointed felt sales engineer; and **William L. Korn,** field service engineer, for Huyck Felt Co. of Rensselaer, N.Y. and Aliceville, Ala. Winship has been assigned to cover the Middle Atlantic states. Korn has been assigned to work with **Philip E. Anderson,** felt sales engineer for Wisconsin, Minnesota and the Upper Michigan Peninsula.

Pusey & Jones Corp. of Wilmington, Del., has appointed **Sidney G. Briscoe** as vice president in charge of sales. He has been with the company for 24 years, serving as general sales manager for the past five years and previous to that, as company representative in New York and New England.

Robert L. Fraser was recently appointed assistant sales coordinator for Jamesbury Corp. of Worcester, Mass., and will work out of its headquarters in a liaison capacity of coordinating engineering production and sales of Jamesbury ball valves. **Charles A. Richardson,** newly appointed sales representative for the company's New England area, will also assist franchised dealers in developing new industrial applications for the ball valves. **Karl Johnson** is the new Jamesbury representative for the St. Louis-Kansas City, Mo., area.

N. Roderic Dover has joined the headquarters staff of Wisconsin Iron Works in Appleton, Wis. He will be responsible for technical liaison between the mills and the company.

DARLING'S ANIMAL BONE GLUE
SERVES THE PAPER INDUSTRY

with Product and Technical Counsel

for CONVERTERS—
as an ADHESIVE
for
Gummed Tape
•
Gummed Labels
•
Tube and Can Winding
•
Specialty Boxes
•
End Sealing

for PAPER MAKERS—
as a CHEMICAL
to
improve Retention
of fibre and filler
•
increase efficiency
in Flotation Savealls

DARLING'S
Improved BONE GLUE

See your
DARLING Representative
or write
DARLING & COMPANY,
Glue Division,
4201 South Ashland Avenue,
Chicago 9, Illinois

Necrology . . .

Abraham Levin

Abraham Levin, vice president in charge of Latin American Div. of International Paper Co., recently died of a heart ailment at his home in Havana, Cuba.

George E. Smith

George E. Smith, a former executive of International Paper Co., died last July after a short illness. During

(Continued on page 438)

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.90— .95
No. 2 roofing (Chicago)	.70— .75
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	Nominal
New light silesias	Nominal
Light flannelettes	Nominal
Unbleached cuttings	Nominal
New white cuttings	Nominal
New light oxfords	Nominal
New light prints	Nominal

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	Nominal
No. 3 white linens	Nominal
No. 4 white linens	Nominal
No. 1 white cottons	Nominal
No. 2 white cottons	Nominal
No. 3 white cottons	Nominal
No. 4 white cottons	Nominal
Extra light prints	Nominal
Ordinary light printe	Nominal
Medium light prints	Nominal
Dutch blue cottons	Nominal
French blue cottons	Nominal
French blue linens	Nominal
Checks and blues	Nominal
Linsey garments	Nominal
Dark cottons	Nominal
Old shopperies	Nominal

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00— 95.00
No. 1 hard white shavings	75.00— 80.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	60.00— 65.00
Fly leaf shavings No. 1	30.00— 35.00
Fly leaf, woody, No. 1	25.00— 27.50
Mixed colored shavings	21.00— 23.00
No. 1 books and magazines	29.00— 30.00
Ledger stock, white, No. 1	52.50— 55.00
Ledger stock colored, No. 1 (Midwest ship)	35.00— 40.00
New manila envelope cuttings (free of groundwood)	70.00— 75.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	75.00— 80.00
Colored tab cards	55.00— 60.00
New northern kraft envelope cuttings	65.00— 70.00
Triple sorted kraft, 100%	35.00— 37.00
No. 1 old kraft	30.00—
White news cuts, No. 1	55 00— 60.00
No. 1 overissue news	20.00— 22.00
Folded news, special	18.00— 19.00
Folded news, ordinary	16.00— 17.00
Old corrugated boxes	22.00— 23.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	11.00— 13.00
Boxboard cuttings	7.00— 9.00
No. 1 mixed paper	12.00— 13.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	145.00—
L. c. l., ton	155.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 98%, drums c. l., delivered lb.	.29⅛—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.14¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	10.10—
N	10.20—
WG	10.40—
WW	10.60—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	8.75—
N	8.95—
WG	9.15—
WW	9.45—
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅛—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100 00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.55
No. 2 enamels	19.55
Machine-coated, 45- to 100-lb.	15.55— 19.00
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	22.25
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	21.10
Rag Content Bond (white, 5000 to 10 000-lb. sub 20, ream sealed ca-tons):	per cwt
100% rag	—
75% "	—
50% "	—
25% "	—
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	—
75% "	—
50% "	—
25% "	—
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.50
60-lb.	8.75
50-lb.	9.00
40-lb.	9.25
35-lb.	9.75
30-lb.	10.50
25-lb.	11.25
20-lb.	12.25
No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.00
(Sheets — Plus 50c cwt)	

Buckeye Cellulose

(Continued from page 390)

(5) three No. 6 W duplex suction pumps, caustic type, with drives; and (6) an AP paddle agitator for a 20-ft.-dia. by 20-ft.-deep tank.

An interesting operation in the recaustizing system is the use of two continuous centrifugal filters. One of them is used in dewatering the recovered lime mud and thereby removing soluble impurities and particularly magnesium compounds from the lime mud prior to its entry into the kiln. The other centrifugal filter is used on lime sludge from the water softening system, delivering the lime to the kiln.

Power

In addition to the 285,000 lb/hr steam power supply from the recovery unit, a 10,000 KW non-condensing turbine generator was added.

The power distribution system includes two new 12.47 KV feeders, 15 substations, and banks of 100 KVA transformers.

Motors are generally squirrel cage induction type of totally enclosed design.

Water supply

Three new wells were drilled to supply 26 million gal. of water per day. A new 125-ft.-dia. cold lime softener equipped with automatic desludging controls, three pneumatically paced continuous weighing feeders, chlorinators and a silactor were installed.

A new 2-million gal. wire-wound concrete reservoir with integral concrete shell dome was erected.

General service water is supplied through 36-in. cast iron and carbon steel lines by two new 10,000 gpm pumps driven by 500-hp, mounted, weather-protected motors.

The ion exchange system includes nine new 10-ft.-dia. sand and gravel pressure filters, a 10-ft.-dia. acid cation exchange unit, three 10-ft.-dia. sodium cation exchange units, and two 10-ft.-dia. anion exchange units.

Necrology . . .

(Continued from page 436)

on paper coating and laminating, and wrote several technical articles on the two subjects.

Frank W. Egan

Frank W. Egan, founder and chairman of the board of directors of Frank W. Egan & Co. in Somerville, N. J., died last July. He was considered one of the foremost American authorities World War II, he was head of the paper industry's Resident Advisory Board in Washington, D. C.

Thomas R. Bissell

Thomas R. Bissell, descendent of a pioneer Massillon Paper family and a director of Ohio Paper Products Co. died recently in Cleveland. He also served as district sales manager for Timken Roller Bearing Co. in Canton, Ohio.

Wayne A. Brown

Wayne A. Brown, assistant vice president of Crown Zellerbach Corp. of San Francisco and manager of its eastern division in New York, died recently in White Sulphur Springs, W. Va. He served on the board of governors of APPA and was president of its various divisional associations such as: Kraft Paper Association Inc.; Paper Shipping Sack Mfgrs. Association Inc.; Tissue Association; Specialty Paper & Board Affiliates Inc.; and Sulphite Paper Mfgrs. Association Inc.

Brown was active in the National Council For Stream Improvement, Waterproof Paper Mfgrs. Association, and the Paper Bag Institute. He also served as an officer of the Pulp, Paper & Paperboard Export Association of the U.S.

Current Comments . . .

(Continued from page 397)

Kimberly-Clark Corp.—Income for fiscal year ended April 30, $26,344,100; a year ago, $25,528,512. Sales reached a new high of $368,232,380.

Lily-Tulip Cup Corp.—Six months income, $3,343,719; a year ago, $2,931,430.

Mead Corp.—Income for 24 weeks ended June 14, $6,210,248; a year ago, $4,689,876.

Minnesota & Ontario Paper Co.—Six months income, $2,918,919; a year ago, $2,252,031.

Oxford Paper Co.—Six months income, $801,056; a year ago, $579,950.

Paterson Parchment Paper Co.—Six months income, $316,061; a year ago, $220,067.

P. H. Glatfelter Co.—Six months income, $1,131,251; a year ago, $921,315.

Puget Sound Pulp & Timber Co.—Six months income, $2,153,694; a year ago, $1,323,352.

Rayonier Inc.—Six months income, $6,592,117; a year ago $1,175,217.

Riegel Paper Corp.—Six months income, $1,524,870; a year ago, $1,226,533.

St. Regis Paper Co.—Six months income, $13,422,471; a year ago, $8,069,009.

Sealright-Oswego Falls Corp.—Six months income, $1,163,000; a year ago, $1,074,958.

Sorg Paper Co.—Income for first two quarters, $336,277; a year ago, $206,181.

Sutherland Paper Co.—Income for six months, $1,278,025; a year ago, $1,156,410.

Union Bag-Camp Paper Corp.—Six months income, $4,685,746; a year ago, $3,369,354.

Financial Report

Paper mill securities in July were at almost a dead center with no marked changes in either direction. One or two showed considerable strength, while some dropped slightly. As a rule paperboard quotations were firmest.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	August 7, 1959	July 10, 1959
American Can	45¾	46
Same Pref.	38	37⅞
Celotex	* 38⅛	37⅞
Same Pref.	* 18½-19	* 18½-19½
Certain-Teed	14⅜	14⅛
Champion P. & F.	45½	* 41-41⅛
Same Pref.	96¼	94
Chesapeake of Va.	* 38¼-39¼	* 38½-39
Container	28¾	26¼
Same Pref.	* 89½-90½	—
Continental Can	52⅜	47½
Same Pref.	* 81½-83	79½
Crown Zellerbach	53½	53¼
Same Pref.	90	91¾
Diamond-Gardner	33⅛	33⅛
Same Pref.	30½	30¼
Federal Paperboard	46½	45¾
Same Pref.	23	22⅛
Fibre Paper Board	49⅛	51⅜
Great Northern	54⅜	50
Hammermill	35⅞	31⅝
International	131	122⅛
Same Pref.	* 89½-91	90½
Kimberly-Clark	69¼	69¼
McAndrews & Forbes	31⅞	33
Masonite	41½	42½
Mead Corp.	45¼	46½
Same Pref.	* 89⅛-92½	* 90-92½
Minnesota & Ontario	34⅞	35¾
Oxford Paper	33¼	31½
Same Pref.	94½	93-94½
Rayonier	27¼	29½
Riegel Paper	44⅛	38½
St. Regis	51⅝	52
Same Pref.	* 93½-95½	* 93⅛-95
Scott Paper	85	83
Same $4 Pref.	* 87⅝-89¼	* 87-89½
Same $3.40 Pref.	77	* 77⅛-78⅛
Sealright	41	41⅜
Standard Packaging	36	36½
Same $1.60 Pref.	*105-114	—
Same $1.20 Pref.	39½	40½
Sutherland Paper	40	39
Union Bag-Camp	43½	45¾
United B. & C.	35⅜	35½
United Wallpaper	8⅛-8⅞	8¼
Same Pref.	* 17-18½	* 18-19½
U. S. Gypsum	108½	108
Same Pref.	150½	*151⅛
West Va. P. & P.	49	48
Same Pref.	* 94½-95	* 97-98

New York Stock Exchange — Bonds

Champion P. & F. 4¾%	113	115
Champion P. & F. 3¼%	—	—
Diamond Gardner 33%	90¾	—
Kimberly-Clark 3%	88½	87⅛
Mead 3%	—	—
Oxford 4¾%	110½	110¾
Scott 3%	110¾	108½

American Stock Exchange — Stocks

Allied Paper	12	12
American Writing	33	32
Brown	14½	13¼
Puget Sound	25⅜	23½

*Closing Bid and Asked Prices

Index to Advertisers

Acme Steel Company 370
Adell Chemical Company .....
Albany Felt Company 363
Allied Chemical Corp., General Chemical Division .....
American Cast Iron Paper Co. 372
American Cyanamid Co. .....
American Paper & Pulp Co., Inc. 414
Anheuser-Busch, Inc. .....
Antara Chemicals .....
Appleton Wire Works, Inc. 362
Appleton Wood Products Co. .....
Arnold, Hoffman & Co., Inc. 419
Asten-Hill Mfg. Co. .....
Atkins Saw Division 408

Barco Manufacturing Co. 393
Beloit Iron Works 373-374
Bird Machine Company 394
Black-Clawson Company, The .....
Burgess-Manning Company .....

Cameron Machine Co. .....
Carthage Machine Co. .....
Chemical Industries, 27th Exposition of 418
CIBA Company Inc. .....
Classified Advertising 434, 435
Clinton Corn Processing Co. .....
Corn Products Sales Co. .....
Curtiss-Wright Corporation ..... 4th Cover
Cylinder Mfg. Co. 431

Darling & Company 436
Dempster Brothers 366
De Zurik Corporation 423
Diamond Power Specialty Corp. .....
Dow Chemical Co. 365
Draper Brothers Company 409
Dusenbery Co., Inc., John 427

Egan & Co., Frank W. .....
English China Clays Sales Corp. 409

Fisher Governor Company 439
Fitchburg Screen Plate Co., Inc. 422
Foote Bros. Gear & Machine Corp. .....
Fritz Publications, Inc. 435

General Dyestuff Company 368

Hanchett Manufacturing Co. 439
Heil Company, The .....
Horton Manufacturing Co., Inc. 416
Hubinger Company, The 400
Humphrey Elevator Company 431
Huyck Felt Co. 399

Illinois Gear & Machine Co. .....
Improved Machinery, Inc. 428

Jamesbury Corp. ..... 1st Cover
Jenkins Sons, Inc., M. W. 430
Johnson Corporation, The 418
Jones Corporation, E. D. ..... 3rd Cover

Kalamazoo Tank & Silo Co. 425
Kerrigan Iron Works, Inc. 426

Lake Engineering Co. .....
Lawson Company, The 371
Layne & Bowler, Inc. 413
Lestoil, Inc. .....
Link-Belt Company 361
Lodding Engineering Corp. 375
Lummus Co. ..... 2nd Cover

Marathon Southern Corporation .....
Maxson Automatic Machinery Co. .....
Moisture Register Co. 429
Murray Mfg. Co., D. J. .....

Nash Engineering Co., The 403
National Safety Council 434
Naylor Pipe Company 398
Northwest Engineering Company .....
Norton Company 406

Oilgear Company, The 411
Overly's Inc. 416

Paper Industry, The 435
Parsons & Whittemore Inc. 369
Patton Manufacturing Co., Inc., The .....
Penick & Ford, Ltd., Inc. .....
Perkins & Son, Inc., B. F. .....
Photovolt Corporation 420
Planet Corporation 397
Poirier Control Company .....
Post Machinery Co. 432
Pusey & Jones Corp., The .....

Charles P. Raymond Service, Inc. 435
Rogers & Co., Samuel C. 422
Ross Midwest Fulton Corp. 415

Sandy Hill Iron and Brass Works 355
Scapa Dryers, Inc. .....
Shuler & Benninghofen 405
Signode Steel Strapping Co. 367
Sinclair Company, The 435
Smidth & Co., F. L. .....
Spraying Systems Co. 435
Sprout Waldron & Co., Inc. 360
Staley Mfg. Co., A. E. .....
Standard Oil Co. (Indiana) .....
Stebbins Engineering & Mfgr. Co. 407
Stickle Steam Specialties Co. 421
Sveen-Pederson Sales Corp. .....
Swenson Evaporator Company .....

Tennessee Corporation .....
Texas Gulf Sulphur Co. 396
Torrington Company, The 356

Union Asbestos & Rubber Co. 392

Valley Iron Works Company 364
Vanderbilt Co., R. T. 358

Waldorf Industrial Controls 420
Waterbury Felt Company 416
Weyerhaeuser Timber Co. .....
Whiting Corporation .....
Williams-Gray Company 425
Wisconsin Wire Works 417
Wolferz Alloy Equipment, E. C. 410

Yarnall-Waring Company .....

Professional & Business Service Section
Sirrine Company, J. E. 434

HANCHETT CIRCULAR KNIFE GRINDER

For TOP and BOTTOM SLITTER KNIVES
SCORING KNIVES and SEGMENTS
SEMI and FULL Automatic

GUARANTEE:

1. Concentric with Bore and Running Truth .0005
2. Micro Inch Finishes
3. Grinds Single, Double and Compound Bevels
4. Positive — Accurate Fixturing
5. Longer Mill Life (Less Changes)

MODEL SK-24 WET GRIND

TEST GRIND

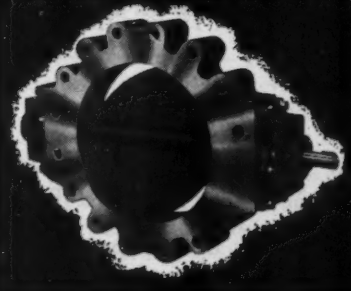
We are prepared to grind knives for your inspection and Mill Test.

HANCHETT MANUFACTURING CO.
Main Office — BIG RAPIDS, MICHIGAN
West Coast — PORTLAND 1, OREGON

HOW ABOUT

BUTTERFLY VALVES

FOR MANUAL and POWER CONTROL



FISHER-CONTINENTAL Butterfly Valves fit the specifications of a vast majority of applications. They're low cost—more compact than expensive, complex valve installations. And they're easier to operate and service, too.

FISHER-CONTINENTAL GIVES YOU FULL FREEDOM OF CHOICE

For gas, vapor, liquid or semi-solid control problems specify Fisher-Continental Butterfly Valves—any size . . . any metal or alloy . . . any temperature . . . any fluid . . . any pressure . . . any condition . . . any operator, manual or power.

For complete details about Fisher-Continental Butterfly Valves send for free literature.

FISHER GOVERNOR COMPANY
Marshalltown, Iowa/Woodstock, Ontario/London, England
Direct Inquiries To:
CONTINENTAL EQUIPMENT CO. DIVISION, CORAOPOLIS, PENNSYLVANIA

FISHER Controls
SINCE 1880

New equipment and woodlands mechanization save $25 per ton of newsprint

Newsprint would cost $25 a ton more in terms of today's labor rates but with methods and equipment used in 1949. These savings must be credited to the greater productivity achieved with the installation of new plant equipment, faster paper machines and mechanization of woodlands operations. Of the savings realized by the new machines and techniques, $5.50 per newsprint ton are attributed to mechanization of woodlands operations and $20.00 per ton to new machines and equipment in newsprint manufacturing.

High amylose corn developed

Plant breeders have succeeded over a 10 year period in raising the amylose content of experimental corn hybrids from 27 to over 80 per cent of the total starch content. This rapid progress has encouraged the hope for developing corn with all-amylose starch.

The development is of importance to the paper industry as it provides a material for (1) grease-resistant coatings for special foodpackaging papers; (2) coatings of high adhesive strength; (3) fiber binding in paper.

Effect of fertilizer on tree growth to be studied in a greenhouse

A 1000 sq. ft. greenhouse is being constructed by Crown Zellerbach Corp. at Camas, Washington, to study seedling survival and the effect of fertilizers on the early growth rate of Douglas fir, western hemlock, Sitka spruce and other commercial softwoods. The greenhouse is seen as a forest tool that extends the growing season to 12 months, reduces time consuming field trials and eliminates hazards and damage caused by weather and wild life. "Twenty trees in a greenhouse", says Ray Austin, who is in charge of the company's forestry research, "produce better results than 400 in a field test plot".

A liquid dye for paper

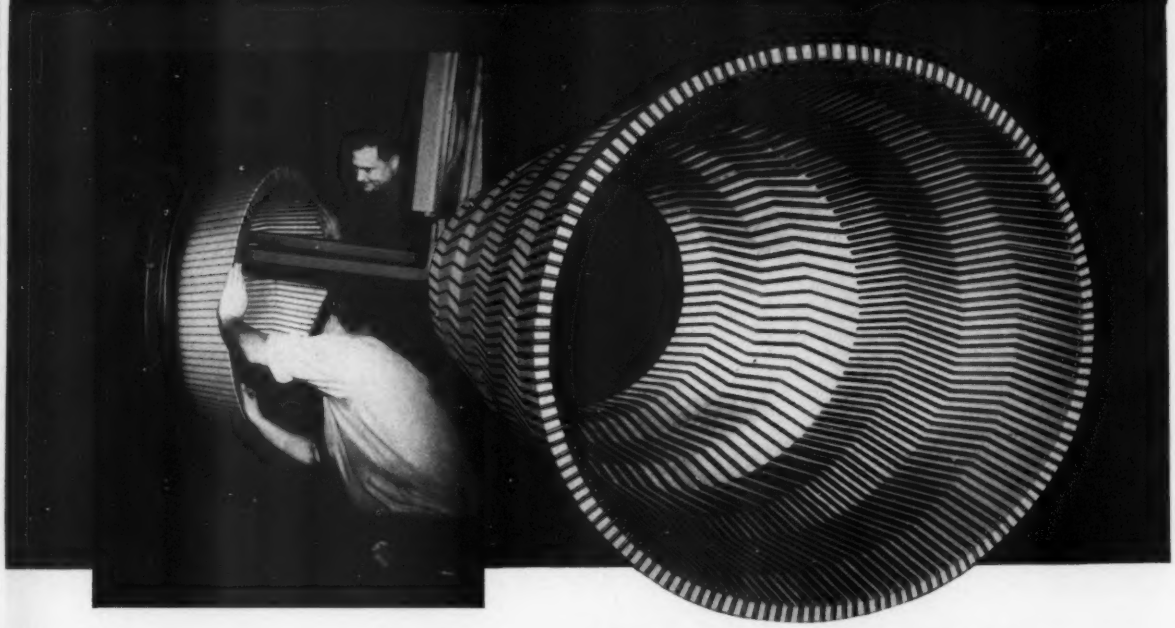
A new liquid dye for paper, Green MX Liquid, has been developed by American Cyanamid Co. The advantages envisaged in the use of a liquid dye include: (1) elimination of dust and handling problems associated with dyes in powder form; (2) use of volumetric measurements permit rapid way of adding the dye to either the preparation tank or directly to the mixing tank; and (3) elimination of problems of solubility or dilution associated with some dyes in powder form.

Filming amine reduces steam line maintenance

The use of a filming amine has enabled Whippany Paper Board Co. to reduce steam line maintenance more than 60 per cent, it is reported. The amine, added to the boiler feedwater at the rate of 1.25 lbs. per million pounds of steam, forms a thin protective film on metal surfaces contacted by the condensate and effectively controls rust and corrosion.

In addition, the use of the filming amine has led to an improvement of heat transfer as evidenced by a surface temperature increase of 20° F. in the dryers.

FIRST



Jones® FULBAR Shell Fillings

FIRST in design – Jones *pioneered one-piece shell fillings* – with any bar construction and any bar material to fit any Jordan. *When you buy Jones Fulbar, you buy top experience!*

FIRST in performance – Jones *patented* Nowave pattern wears evener, eliminates clear channels for untreated stock to "sneak through," prevents knots and strings. *When you buy Jones Fulbar, you buy top results!*

FIRST in economy – Rigid, accurate Fulbar fillings eliminate the need for keys and wedges. They're easier to install, easier to grind in, last longer. *When you buy Jones Fulbar, you buy top savings!*

FIRST in sales – Jones has built more than 1500 one-piece Fulbar shell fillings and installed them in hundreds of mills from coast to coast. *When you buy Jones Fulbar, you buy the leader in the field!*

At your *first* opportunity, ask your Jones representative for complete information on Jones Fulbar Shell Fillings and Jones Adapta-Plugs.* Bars available in specially heat-treated Super Stainless, carbon steel, phosphor bronze or other material to meet your needs.

*Patented

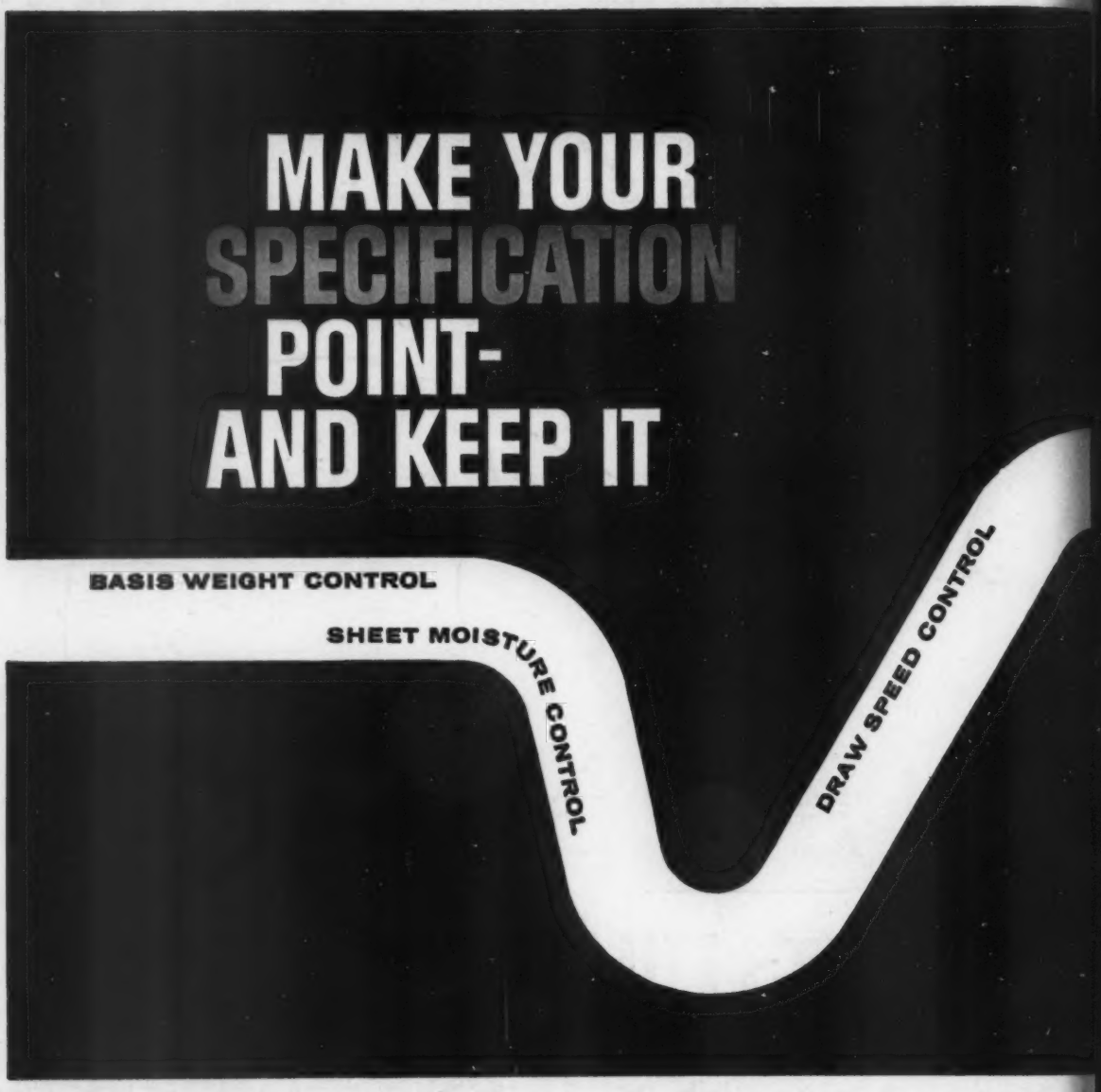
E. D. JONES CORPORATION

Pittsfield, Massachusetts

Member of the Beloit Group

ESTABLISHED 1845 PAPER MAKING Jones® MACHINERY

Jones equipment is sold in Canada by The Alexander Fleck, Ltd., Ottawa • Overseas Export Agents: Castle & Overton, Inc., New York 20, N. Y. • Foreign Licensees: France – Batignolles-Chatillon • Italy – de Bartolomeis • Spain – Gabilondo • Japan – Mitsubishi Heavy Industries.



The paper industry's leader in basis weight and moisture control systems

Industrial Controls Department
PRINCETON DIVISION

CURTISS-WRIGHT
CORPORATION • PRINCETON, N. J.

The papermaker—or converter—who calls on the services of a company that supplies all the units for a complete system assures himself that these are *companion* tools designed to work together. Curtiss-Wright supplies all the tools for such systems.

Curtiss-Wright *companion* tools permit faster startups and changeovers. Then, during processing, these same tools provide accurate measurement and control of the set-up specification.

One unit of a custom-designed system is the Curtiss-Wright Betagage. It uses nuclear energy to measure and regulate basis weight without touching the paper. Or it may be applied to the control of coating and impregnating operations. Another tool, Aquatel*, provides for instant reading and control of sheet moisture. And the Curtiss-Wright Draw Speed Gauge presents highly accurate readings of tensions between rotating rolls.

Curtiss-Wright combines modules such as these into complete systems that result in maximum profit from uniform quality—minimum loss of production per ton of stock. Discuss these products and the systems that they make possible with your Curtiss-Wright engineer. He's at your service—without obligation.

*Trademark registered